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Railway Age

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SIXTY-SIXTH YEAR

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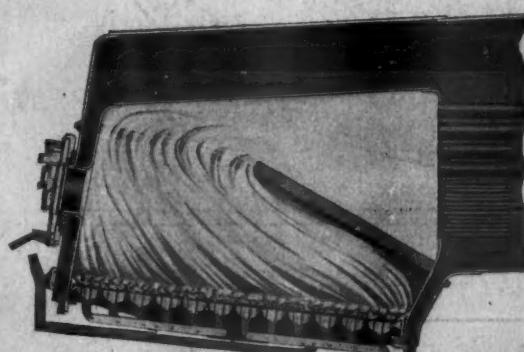
Return on the Arch	2,066 x \$1,000 =	\$2,066,000
Original investment	2,066 x 100 =	206,600

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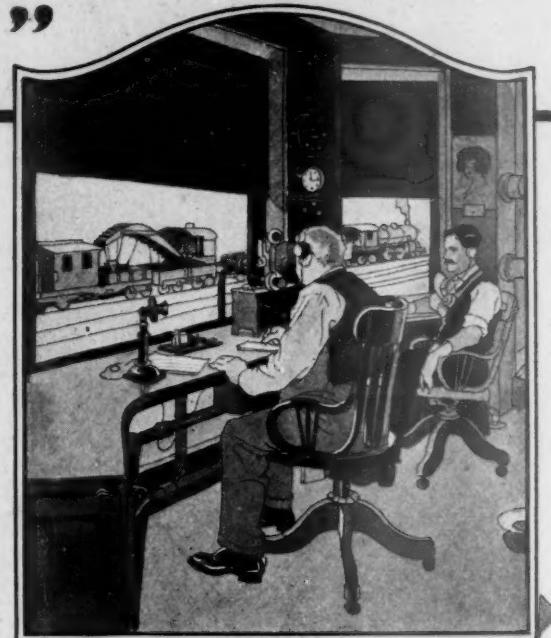
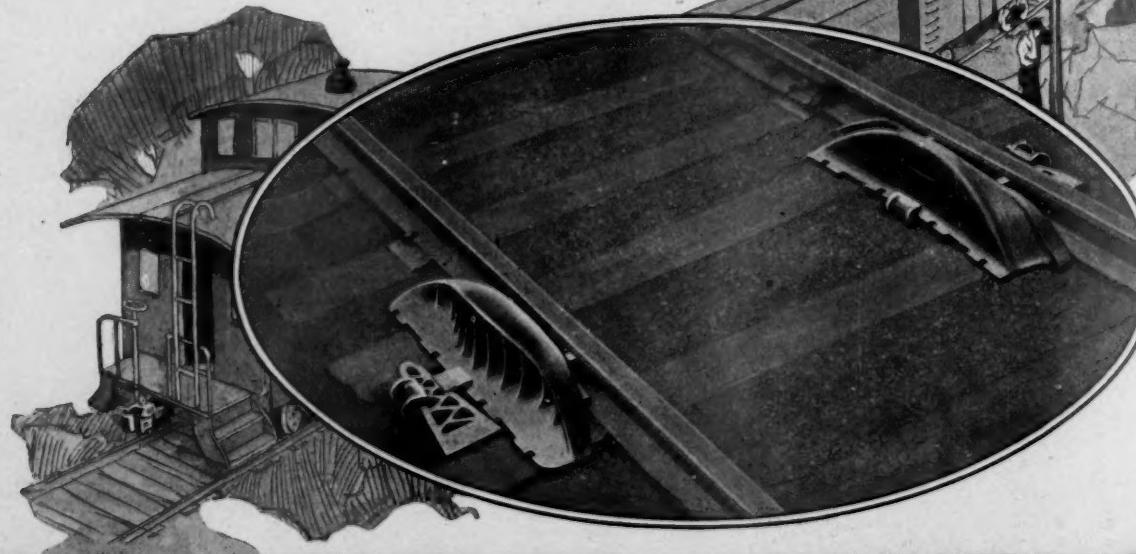
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EDITORIAL



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Some eminent historian and student of American government has expressed the opinion that although the Senate is on the

**The
Senate
Recess**
whole composed of men of more mature judgment than is the House of Representatives and proposed measures receive much more complete and learned

discussion in the higher body, it is

nevertheless true that the record of actual accomplishment of the one body is not so much better than that of the other. This is perhaps a weighty manner in which to refer to a measure like the proposed railroad funding bill, but it does nevertheless seem to apply rather aptly. The Senate recessed on August 24 without having come to a vote on the Townsend bill although the House had already voted favorably on its companion Winslow bill. That the Senate should have failed to pass this measure before its recess is—to say it as mildly as possible—unfortunate. The reasons for its failure to secure action are many, but the most striking one is the fact that discussion continued so long as to use up all the time that was available. The strange part is that one of those senators who did most to prevent action is supposed to be a friend of labor. One of the chief arguments in favor of the bill was that by releasing capital at present tied up, the railroads and the companies which sell to them would be permitted to "resume," in other words, to start the wheels turning, thereby enabling men now laid off to return to work. Love of discussion is doubtless a great thing, but it is rather difficult to see how a professed friend of labor and of the people can justify discussion and expression of his love for "the people as against the interests" while at the same time his actions are hurtful to the very people for whom he essays to speak.

On August 15 when government control ended, the railways of Great Britain embarked upon what promises to be the

**Britain's
Railway
Experiment**

most interesting period in the history of transportation in that country. The railways have been returned to their owners without government guarantees in spite of decreased earning power

and a rate scale so high that general increases are not contemplated. The managements have a difficult problem before them which is complicated, but perhaps also made easier of solution, by the setting up of a tribunal to fix rates sufficiently high to secure fair returns to the companies and by the mandatory consolidation of the roads into four systems, plans for which the carriers must submit by January 1, 1923, or else have the consolidations effected by the government as it sees fit. In the main the system of regulation of rates and services which the government of Great Britain has assumed is not without precedent elsewhere and embodies no features which would be startling to one familiar with the minute details of practice which are regulated by public bodies in this country. The method of settling labor disputes, too, is not a radical departure from precedent. The compulsory consolidation of the railways is the remarkable feature of the new legislation. The amalgamation is on a non-competitive, territorial basis—an entirely different theory from the

voluntary consolidation on the basis of competitive systems provided in our Transportation Act. There are some who expect great economies to be effected by these consolidations. Whether their expectations are justified, time only will show. At any rate, we in America can thank Great Britain for making the experiment, hoping that reliable data may be available from their experience in this direction before any far-reaching steps toward consolidation are taken in this country:

The average citizen of the United States believes that the cost of the fuel for the locomotive together with the wages

**Local
Railroad
Publicity**
of the train crew and ticket agent constitutes the major part of the cost of operating a railroad. Other expenses for supplies, maintenance of way and rolling stock are given small consider-

ation in their calculation. However, the expenses of the store, signal, telegraph, engineering and police departments, with whom the public has little or no contact, are only a few of the necessary costs concerning which the public has little conception. Adverse public opinion was a controlling factor in bringing about the present predicament of the railroads and it would therefore seem to be the duty of every railroad officer, employee and stockholder, to help enlighten the general public on a few of the difficulties now being encountered by the railroads. A short instructive talk before the Commercial Club on the function and expense of a certain department by the local representative will have a broad influence in the community. Officers out on the line should be prepared to speak before gatherings of farmers or business men. The opportunity is not limited to rare occasions, for the doctor, lawyer, farmer and the traveling public in general are keenly interested in the railroad and will listen with interest to any conversation explaining some phase of railroad operation. Such local publicity, properly directed all along the line, will exert an extensive influence on future railroad regulation. The management of every railway should take pains to put in the hands of all of their local officers information which will enable them to discuss the railway situation effectively with those with whom they constantly come in contact.

The delivery of cars by the builders in July was greater than the production of the previous month and the number of

**Car Orders
and
Deliveries**

cars on order and undelivered was reduced, as shown by the Railway Car Manufacturers' Association's monthly statement published elsewhere in this issue. The production of freight cars in July for domestic service as reported by the 26 car building plants was 3,892 and the freight cars on order and undelivered at the end of July was 6,145 cars, as compared with a production of 2,245 and a total of 12,149 on order and undelivered at the end of the previous month. The above figures show that there were 1,647 more cars delivered for domestic service and that the number of cars on order

was reduced 50 per cent during July as compared with the previous month. The reduction of cars on order is due not to increased output of the shops, but rather to a lack of orders being placed for new equipment. The number of cars to be repaired on order and undelivered increased during July. The figures for deliveries of cars during August are not yet available, but orders placed and inquiries for new equipment and repairs in the equipment record of the *Railway Age* show that orders were placed in August for repairs to 6,423 freight cars and inquiries for prices on repairs were made for a total of 3,000 cars. There were only 101 new freight cars ordered in August. Orders placed during August for locomotives totaled 67 for export and only 2 for domestic service. Equipment business at present continues to be principally in orders for repairs rather than in orders for new cars, but even orders for repairs are apparently being delayed until definite action is taken on the funding bill now in Congress.

The steps which are being taken by the Boston & Maine to meet motor truck competition are noteworthy as being

Meeting Motor Truck Competition among the few examples wherein a railroad has made a determined effort to hold its traffic against the rivalry of the truck. The action taken by the road is not particularly novel or original. It is in the form of a reduction of some 33½ to 50 per cent in what are termed the rates on "express matter, miscellaneous shipments of, contents unknown or not stated," applying to cities and towns within a distance of 50 miles from Boston. These express rates are used by industrial concerns and the local express companies, the manner in which they are used by the latter being somewhat as follows: The local express companies pick up the traffic, let us say, in Boston; the freight is loaded into a railroad car and after its rail movement it is distributed by the express company in the local community. The tariff contains a note saying that the rates "will apply only when an individual car is assigned exclusively to this service." The new tariff was filed August 6 and effective September 10, except in the case of some of the rates which have already gone into effect. One of the typical rates is that applying to Lowell, 28 miles out of Boston, wherein a charge is made of 9 cents per 100 lb. with a \$20 per car minimum; a few months ago this rate was 20½ cents per 100 lb. with a \$15 minimum. The scheme of moving traffic under these miscellaneous express rates is of long standing, but in recent years the motor truck has cut sharply into the business, so that it is estimated that to some of the cities in the local zone 50 per cent and even 80 or 90 per cent has been handled on the highways, the proportion depending in a large measure upon the distance. There seems to be an idea that the Boston & Maine has cut its local less than car-load rates; in view of the manner in which the reduced rates are to be applied this construction of the road's action is hardly correct. It would be a commonplace to say that the progress which may be made under the new rates will be watched with considerable interest.

While it is true that many railroads now have a reserve of serviceable locomotives, the large reduction in shop and enginehouse forces of many other roads

Locomotive Maintenance in Slack Times has made it difficult to do much more than maintain running repairs, to say nothing of accumulating a surplus. Approximately 60 per cent of railroad earnings are spent in wages and when the first order came a few months ago to reduce expenses the most natural step

was to reduce forces and cut labor costs. This policy was logical and to be expected but it has had several serious results. Any reduction of forces below that required for normal shop operation is open to the objection that important repair work must necessarily be put off. This can be classed as deferred maintenance work which, if delayed until business is good, will be extremely costly on account of holding locomotives in repair shops when they should be on the road earning revenue. Additional disadvantages of letting too many men go are the loss of organization and morale and the subsequent expense of hiring new men whose abilities are unknown. As one mechanical officer says: "Too much use is made of the easy way of reducing expenses by making too drastic cuts in the labor force, which results in increased expenses in other ways. For example, a man who was assigned to look after air leaks in a large shop was taken off to save his wages, with the result that the increase in air leaks caused a loss equal to many times his wages in additional coal consumed, wear on air compressors, and low air pressure causing slowing up of the work." It is especially costly when roundhouse forces are cut too much. A broken or defective locomotive part should be replaced or repaired immediately, otherwise it may cause the failure of a far more important and expensive part. If enough men are not left in the roundhouse organization to take the proverbial "stitch in time" the resultant cost due to inadequate maintenance of running repairs will far more than offset possible labor savings.

The stock market two or three weeks ago was apparently trying to reconcile a feeling of pleasure that the June net of

Strength in Railway Securities the Class I railroads—\$51,641,014—represented a gain of some \$14,000,000 over May with a trace of disappointment that the June net should have been some \$47,000,000, or 47 per cent,

below the 6 per cent contemplated in *Ex Parte 74*. It is now trying similarly to reconcile its pleasure concerning the reports now appearing showing increases in net for July with disappointment over the failure of the Senate to come to a vote on the railroad funding bill and realization that much of the increase in net for both June and July has been in deferred maintenance. At any rate, the improvement that has taken place—even if it has not been as great as was to have been desired—has been something about which it is worth while becoming interested and things to become interested in seem rather rare in stock market circles at present. The gradual improvement in earnings and the progress made on the funding bill have given the railway shares a strength which industrial shares have not had; we speak with due regard to the temporary decline in railway stock prices following the failure of the Senate to vote on the Townsend bill. The prices of industrial stocks have been experiencing a gradual decline which has now extended with brief interruptions since the fall of 1919. This decline has not affected railway shares in like degree, with the result that the railway and industrial stocks are now nearer together in price than they were. The more present point of interest is that during the past few weeks with the exception of the present week the decline in industrials has been especially pronounced, while on the contrary the railroad shares have advanced several points. The sales of railway shares have not been great enough to show that the rails have regained their old-time popularity. The comparative strength in railway shares as contrasted with the lack of it in industrials shows, however, that the stock market has an open mind on the subject at least insofar as concerns the progress which the railways are making towards restoring their net income to normal levels.

Rates Higher—Railroad

Service Costs Public Less

IN SPITE of higher railway rates, both passenger and freight, the people of the United States paid almost \$21,000,000 less for railroad transportation in the first six months of 1921, under private operation, than they did in the first six months of 1919, under government operation.

This was due partly to the fact that a smaller amount of railroad service was rendered, but mainly to other causes. The first half of 1919, like the first half of 1921, was a period of business depression. The depression was more severe, however, in the first half of 1921, and the amount of freight service rendered was $7\frac{1}{2}$ per cent less than in the corresponding part of 1919, and the amount of passenger service rendered almost 15 per cent less. But in spite of the smaller traffic handled the total earnings of the railways in the first six months of 1921 were almost \$320,000,000 more than in the first six months of 1919. How, then, it may be asked, can it be that the public paid less for its railroad service than in the first six months of 1919?

The explanation is very simple. In 1919, under government control, the public paid in taxes for part of the transportation service it received because the railways were under government control and incurred a large deficit. In the first half of 1921 the public paid for its transportation entirely in freight and passenger rates because the railways were under private operation.

The total earnings of the railways in the first six months of 1919 from their rates were \$2,356,685,390, but the government in these six months, according to the estimate of Director General Hines, incurred a deficit of \$296,101,654, which made the total amount paid by the public in both rates and taxes \$2,652,786,984. The various governments, especially the state governments, got back from this amount in taxes paid to them by the railroads \$91,663,514. This made the net cost to the public of the railroad service rendered to it \$2,561,123,470.

In the first six months of 1921 the total earnings of the railways were \$2,676,497,252. The amount of taxes paid by the railways to the national and state governments was \$136,120,810. Deducting this from the earnings makes the total net cost to the public of the railroad service it received, \$2,540,376,442, or \$20,747,028 less than the net cost in the first six months of 1919.

The saving made to the public in the total amount paid by it for railway transportation was made at the expense of very heavy losses to the owners of the railways. The net operating income actually earned by the railways in the first six months of 1921 was less than \$142,000,000. This was about one-third of the net return they received in the first half of 1919 under government control, when their net return was guaranteed by the government. It was about \$95,000,000 less than the mere interest on their bonds, since six months' interest on their bonds is about \$237,000,000.

Although the public actually paid almost \$21,000,000 more for its railroad service in the first six months of 1919 than in the first six months of 1921, and although the necessity of paying a given amount of taxes imposes as much of a burden on business as the necessity of paying a given amount of rates, the high cost of transportation in the first six months of 1919 did not prevent a great increase of general business activity and of railway traffic in the last half of the year.

The present cost of railroad transportation undoubtedly is too high, but it is the railway owners rather than the public who have suffered most from it thus far this year, since, while the public actually has paid less for railroad service than it did in 1919 under government control, the owners of the railways have received many millions of dollars less of net return.

Fire Risks in Sleeping Cars

THE BURNING of a sleeping car, resulting in the death of five passengers, near Walsenburg, Colo., on the Denver & Rio Grande, on March 16, briefly reported in the *Railway Age* of March 25, page 812, was an unusual disaster which apparently must go into the train-accident record under the head of unexplained. The officers of the road made an investigation, at which were present representatives of the Public Utilities Commission of the state, and a coroner also held hearings; but no formal report has been issued by the coroner or by the commission and, so far as appears, the commission is not going to issue any. Thus, all that the public knows about the tragedy is that it is an unsolved mystery.*

When a problem involving life and death is enveloped in complete darkness the only recourse is to explore all possible sources of danger. The worst fire risks on passenger trains are exceedingly hard to cope with. One well known danger in sleeping cars is the cigarette. Passengers who smoke in their berths are said to be seen quite commonly by porters who are watchful, and this sad accident may well be taken as the occasion for repeating to employees, and through them to the public, the admonition to bear in mind that, in a sleeping car, a fire, once started, has peculiar horrors; and especially so when, late at night, every person in the car may be asleep. An officer of the Canadian Pacific has lately come out in a newspaper statement calling attention to this risk, and appealing to travelers to be more considerate of their fellow passengers' safety—and of their own. He cites a case where a passenger set fire to his bedding, and disastrous consequences were only prevented by the vigilance of the porter. An operating officer of that road informs us that the company's inspectors find large numbers of window ledges scorched by cigarettes which were placed on them by passengers while in the berths. Had the cigarette in any instance fallen into a blanket and been fanned by a draft from an open window, the possible results can be imagined.

Another dangerous practice is the use of liquid fuel lamps and heaters by passengers. The Canadian Pacific has posted in its sleeping cars and coaches the following notice:

AVOID DANGER BY FIRE

"In the public interest, the use by passengers on railway trains of wood alcohol or fuel lamps, 'Theroz Fuel Cubes,' 'Sterno Canned Heat,' or other methods of heating food is prohibited. Food may be heated on the cars by means of the appliances provided by the railway companies."

The notice is, however, ignored by thoughtless and selfish passengers, who use the flame heaters both in wash rooms and in berths. These heaters can be carried in a handbag; and with a locked wash room door, or drawing room door, the passenger can defy the most vigilant porter or trainman. And such passengers are not very likely to realize how easily the sudden stoppage of the train might upset the lamp, set a dressing gown afire and start a panic.

The fire insurance men of the United States at their last convention said that the aggregate of the fire losses in this country in 1920 was \$500,000,000, and the increase in this

*The train involved in this accident was westbound passenger No. 155. The accident occurred about 2 a. m. The train consisted of five cars, and the fourth car in the train, "the sleeping car "Corona," took fire while the train was moving at about 35 miles an hour and five passengers were burnt to death. Two passengers escaped by jumping from windows. These were slightly injured. The porter, who appears to have been asleep at the rear end of the car, barely escaped with his life. There is evidence that the car had become filled with gas, or smoke, so that the occupants were perhaps asphyxiated before they were burned. The fire was first discovered by the engineman or the fireman who, looking back, observed sparks emerging from one of the rear cars; and the train was then stopped. By that time the car was a mass of flame and the trainmen had difficulty in separating it from those ahead of and behind it. Apparently the porter, the only employee on the car, was asleep, the Pullman conductor being in the car ahead and the flagman in the car behind. The investigations held by the railroad company and by the coroner appear to have developed no positive information as to the cause of the fire.

huge total year by year sometimes seems to indicate that the universal American vice of carelessness is incurable. This Canadian Pacific poster, however, suggests a simple duty which deserves the attention of all operating officers. To some officers this poster—as indeed do all posters, circulars and other printed matter—will at once suggest what it cannot do; or, in more natural language, will call to mind the lesson of many experiences, that a printed admonition, aimed at everybody in general and at no one in particular, is of value chiefly as a starting point. The main dependence for effective results must be on vigilant, energetic employees.

Some Facts Bearing on Strike Talk

HERE is much talk at present by railway employees and railway labor leaders regarding strikes. This talk is chiefly due to the 12 per cent reduction in wages ordered by the Railroad Labor Board, effective July 1, and to the Board's recent decision changing the shop crafts' rules regarding overtime. Before any railway employees talk seriously about striking there are certain facts they should carefully weigh.

First, the present situation of railway employees who actually are at work is a very favorable one compared with the situation in which the farmer and other working men find themselves. The average wholesale prices of farm products is only 15 per cent higher than it was in 1913. The average wage per hour of union labor in the United States in the year 1920 was 99 per cent higher than in 1913. Since then wages in almost all other industries, except in the coal mining industry, have been reduced more than in the railroad industry. The average wage per hour of a railway employee is now about 63½ cents, or 125 per cent higher than in 1913. According to the statistics of the Bureau of Labor the average cost of living in the United States in May, 1921, was 80.4 per cent more than in 1913, while the National Industrial Conference Board reported that at that time it was 65.7 per cent more than in July, 1914. It has been declining since then, and the National Industrial Conference Board reported it as being in August only 62 per cent higher than in July, 1914. Therefore, whether we compare his situation with that of the farmer or that of other union working men, or measure it by the changes which have occurred in the cost of living, we are bound to conclude that the present situation of the average railway employee is extremely favorable.

Secondly, there are at present millions of men out of employment in this country and general business continues to be dull. The unemployed include many who have in the past worked on the railways, and who are capable of doing work on the railways again. Seldom has there been a time when it would have been as easy for the railways to have replaced employees who struck as it would be now.

Public sentiment is an important factor in labor troubles. When it is so easy to show that railway employees are very favorably situated with respect to wages and working conditions as it is now, it would be extremely difficult to arouse much public sentiment in favor of railway employees who went on strike. Furthermore, doubtless among the millions who are now unemployed there are not a few who would be glad to accept employment on the railways at even lower wages than those provided for in the Labor Board's recent decision.

The leaders and members of railway labor organizations have at least the average intelligence of the American citizen. They can hardly be unfamiliar with facts such as have been stated in the foregoing, despite all the efforts that radical propagandists have made, and are making, to mislead them. Therefore it does not seem probable that any large class of railway employees will decide that this is an opportune time to strike.

Chesapeake & Ohio

THE IMPORTANCE of our new export trade in coal, the result mainly of the difficulties of the mine operators in the British Isles, enabled the Chesapeake & Ohio in 1920 to do the largest business in its history, and thereby to increase its net railway operating income over 1919 despite the somewhat formidable increase in operating expenses. The net railway operating income for the year—that is disregarding the compensation for federal operations during January and February, and the guaranty for the guaranty period—was nevertheless not up to the figure reached in 1918, in which year the road's net railway operating income exceeded the standard return; nor was it equal to the standard return itself. The net railway operating income in 1920, as reported in the December monthly report to the Interstate Commerce Commission, was \$11,357,968; this compared with a net in 1919 of \$7,463,955; and a net in 1918 of \$17,103,-870. The standard return was \$13,360,000.

In analyzing the operations of the Chesapeake & Ohio for 1920, one is confronted with the fact that although the road for the larger part of the year was probably operated close to its capacity, the directors in May deferred action on the



The Coal Fields on the Chesapeake & Ohio

semi-annual dividend of 2 per cent and at the meetings in June and August still failed to take action. The reason presumably lay not only in the uncertainties of the railway situation, but also in the fact that the Chesapeake & Ohio's traffic, predominately bituminous coal, fell off in rather disastrous fashion in the early part of the year. Another complication was that the Chesapeake & Ohio's corporate income account was kept on a received and not on the accrued basis. The Chesapeake & Ohio has since regained its coal traffic. Comment has already been made in these columns concerning the excellent showing made in June. The road's net railway operating income in the first half of 1921 was \$5,041,319 as compared with \$5,483,768 in the first six months of 1920. In February, which was the low month, there was a deficit of \$556,636; in June, a net of \$1,944,753. It might appear, therefore, as if the directors would be justified in revising their former action in deferring the semi-annual dividend.

The Chesapeake & Ohio in 1920 carried 40,838,116 revenue tons of freight of which 28,625,616 tons, or 70 per cent, was bituminous coal. On this traffic the road secured an average haul of 287 miles. The total ton-mileage for the year was 11,720,030,889 as compared with a figure for 1918, the best previous year, of 10,729,366,446. Much

has been said in these columns of late about the heavy train loads which characterize the operations of the three roads—the Norfolk & Western, the Virginian and the Chesapeake & Ohio—which deliver coal to tidewater at Hampton Roads. In 1920, the Chesapeake & Ohio secured an average revenue train load of 1,131 tons as compared with figures for previous years as follows: 1919, 1,091 tons; 1918, 1,099 tons; 1917, 1,043 tons and 1913, 843 tons. A similarly progressive increase is noted in car loading, the figures being: 1920, 39.1 tons; 1919, 37.7 tons; 1918, 38.2 tons, 1917, 35.6 tons, and 1913, 29.8 tons.

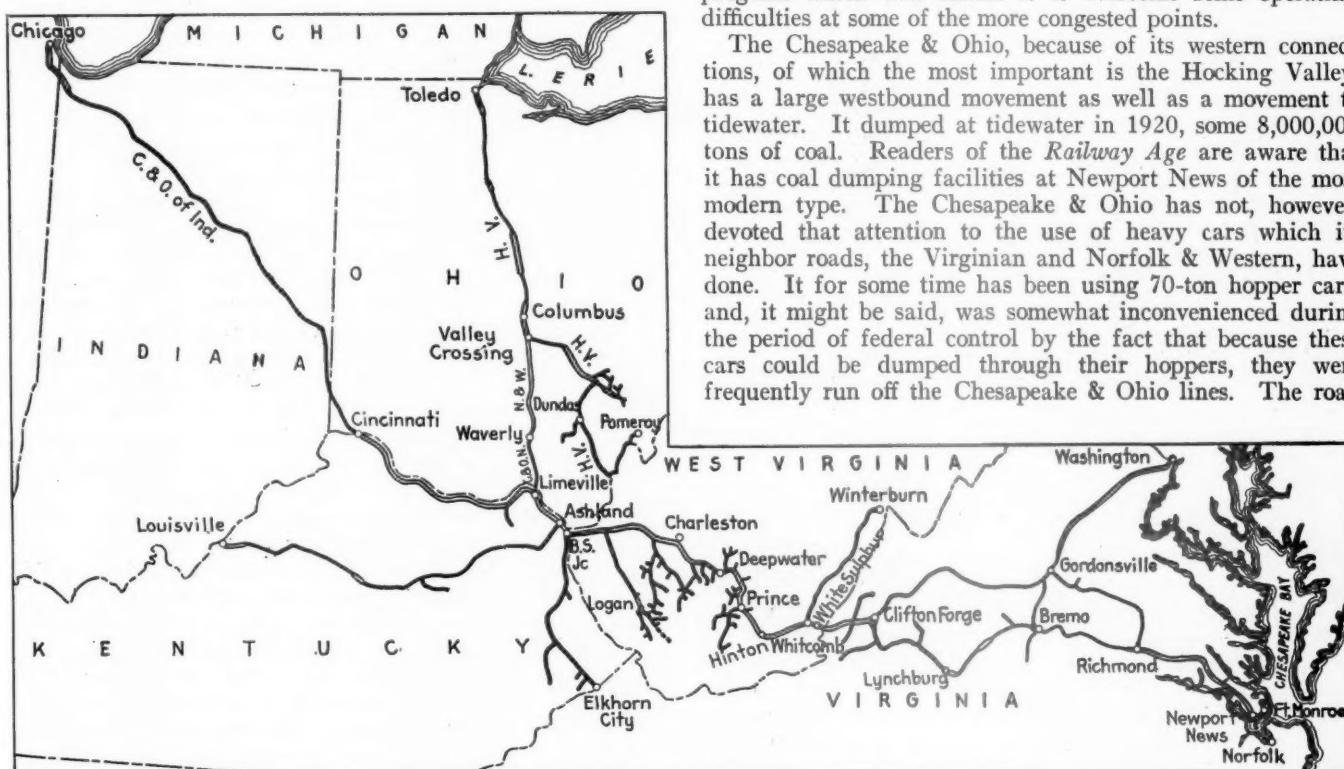
In the sketch of William J. Harahan published in the *Railway Age* of December 10, 1920, at the time of Mr. Harahan's election to the presidency of the Chesapeake & Ohio, considerable was said concerning the characteristics of the property and of the problems which lay before the new president. The opinion was expressed that in the past few years, the development of the Chesapeake & Ohio had been extensive rather than intensive and that the road in the near future would have to devote itself to a program of needed

per cent of the total of the Chesapeake & Ohio's coal traffic.

For many years the Chesapeake & Ohio has had a very open-minded policy in the matter of extending new lines into the coal areas. There is reproduced with this review a map of the lines in the several coal fields served by the Chesapeake & Ohio for the purpose of showing the extensive development which has taken place in recent years. A different symbol is used for those lines which were in existence prior to 1910 and those built since that time. The new construction in the years since 1910 readily indicates why it is that the Chesapeake & Ohio has had such an expansion in its coal traffic as to permit it to carry 17,809,931 tons of coal in the fiscal year ended June 30, 1912, and 28,625,615 tons in 1920.

The Chesapeake & Ohio physically is a high grade road. It cannot be said, however, that it is as yet on a par with the Norfolk & Western which has to meet somewhat similar conditions. The officers of the road would be the last to deny that the property needs more extensive yards and terminals and, in fact, the road now has in contemplation a program which will enable it to overcome some operating difficulties at some of the more congested points.

The Chesapeake & Ohio, because of its western connections, of which the most important is the Hocking Valley, has a large westbound movement as well as a movement to tidewater. It dumped at tidewater in 1920, some 8,000,000 tons of coal. Readers of the *Railway Age* are aware that it has coal dumping facilities at Newport News of the most modern type. The Chesapeake & Ohio has not, however, devoted that attention to the use of heavy cars which its neighbor roads, the Virginian and Norfolk & Western, have done. It for some time has been using 70-ton hopper cars, and, it might be said, was somewhat inconvenienced during the period of federal control by the fact that because these cars could be dumped through their hoppers, they were frequently run off the Chesapeake & Ohio lines. The road



The Chesapeake & Ohio

intensive development. The extensive development referred to included not only the acquisition of the Hocking Valley and the constructions of the Chesapeake & Ohio Northern and the Chesapeake & Ohio of Indiana, but also the manner in which the Chesapeake & Ohio has extended its lines into the coal regions.

The Chesapeake & Ohio receives its coal from four important fields, namely, the New River, the Kanawha, the Logan and the Kentucky. The first supplies a low volatile coal and coal from that region makes up about one-fourth of the total tonnage. Its importance as a source of traffic for the Chesapeake & Ohio has lately been of decreasing importance both actually and relatively to the other fields. The Kanawha and Logan districts supply a high volatile coal. Combined they furnish between 55 and 60 per cent of the Chesapeake & Ohio's total coal tonnage. They are of growing importance and it is in these two districts that the greatest expansion has taken place. The Kentucky field, which also supplies a high volatile coal, makes up about 10

per cent of the total of the Chesapeake & Ohio's coal traffic.

The Chesapeake & Ohio is fortunate enough not to be confronted by the heavy grades over the Alleghanies which are met with on the Virginian and Norfolk & Western. It does not use power as heavy as the 2-8-8-2 and 2-10-10-2 Mallets which are in use on those roads. On December 31, 1920, however, it owned 193 Mallet locomotives of a total of 571 freight locomotives. These Mallet locomotives had an average tractive effort of 74,350 lb. They made up 21 per cent of the Chesapeake & Ohio's total freight locomotives and 33 per cent of the road's total locomotive tractive power. Thirteen such locomotives were added to the equipment in service during the year. In 1920 the road ordered twenty 2-6-6-2 Mallet locomotives of which, as noted, 13 had been received up to the end of the year. It also had on order five ten-wheel switching locomotives and

the 1,000, 100-ton cars previously mentioned. The financing of this equipment was assisted through a loan from the revolving fund of \$3,759,000.

Referring to the corporate income account for 1920 in which consideration is taken of the standard return for January and February when the road was still under federal control, and the guaranty for the guaranty period, it will be noted that the property had a gross income of \$16,160,773. This includes not the entire sum due on the guaranty but only an advance of \$2,700,000. The gross income for 1919 was \$15,282,362. The net income for 1920, after the deductions of interest, etc., was \$5,986,458 as against \$5,774,169 in 1919. Dividends of 4 per cent on the common stock were paid in both years, totaling \$2,511,264. Enough has been said above to make it appear that as far as the 1920 results were concerned, the Chesapeake & Ohio would have been justified in declaring its semi-annual dividend of 2 per cent this year. It is apparent, however, that the voice of conservatism ruled, it being decided best to keep the finances of the property well in hand until general conditions had taken on better aspects than were then apparent.

Operating results in 1919 and 1920 were as follows:

	1920	1919
Mileage operated	2,519	2,506
Freight revenue	\$72,774,680	\$53,073,002
Passenger revenue	11,776,038	14,158,153
Total operating revenue.....	90,524,185	71,475,016
Maintenance of way expenses.....	13,233,158	11,608,515
Maintenance of equipment.....	25,504,674	18,114,492
Traffic expenses	728,632	471,582
Transportation expenses	38,075,751	28,766,158
General	1,899,480	1,542,271
Total operating expenses.....	79,859,097	60,878,522
Net from railway operations.....	10,665,088	10,596,494
Taxes	2,997,720	2,485,078
Railway operating income.....	7,664,736	8,105,846

The corporate income account is as follows:

	1920	1919
Net income, including compensation for January and February, 1920, and net operating income of company from March to December, 1920, inclusive	14,878,831	14,588,579
Interest from investments and accounts.....	1,759,499	1,067,568
Gross income, including other	16,160,731	15,282,362
Net income	5,986,458	5,774,169
Dividends, common 4 per cent.....	2,511,264	2,511,264

Hocking Valley

THE FACT that nobody seems to want to buy coal any more, partly because with the business depression it is not needed for industrial purposes and partly because those who want it for household purposes are apparently waiting until next winter before they buy it, has made the going rather hard of late for the Hocking Valley, 75 per cent of the tonnage of which is bituminous coal. In the first four months of this year the Hocking Valley carried from one-half to two-thirds as much traffic as it carried in the same four months of 1920, although since that time conditions have considerably improved. From January 1 to June 30, 1921, the road has had, according to the June monthly report to the Interstate Commerce Commission, an operating deficit after taxes and rentals of \$480,365, as against a net railway operating income in the first six months of 1920 of \$868,834. The directors of the Hocking Valley some months ago deferred action on the semi-annual dividend of 2 per cent. Under the conditions existing at the time it is difficult to see how any other procedure would have been advisable.

The Hocking Valley in 1920 was no exception to the general rule of increases in gross, greater increases in expenses and resulting decreases in net. Its revenue freight tonnage in 1920 totaled 15,285,862 and its revenue ton-mileage, 1,974,051,120, increases of 21.5 and 31.4 per cent, respectively, over 1919. The total revenues in 1920 totaled \$17,101,493, an increase of 46.7 per cent over 1919. As against this increase in revenues, there was an increase in expenses of 63.2 per cent. The operating ratio in 1919 was 83.8 per cent; in 1920, 93.2 per cent.

The Hocking Valley is controlled through majority stock ownership by the Chesapeake & Ohio. It does not connect directly with the C. & O. but receives from it large quantities of coal bound for the lakes, this traffic moving over the Chesapeake & Ohio Northern to Waverly, Ohio, and thence over the Norfolk & Western to Valley Crossing. The Hocking Valley itself originates a large tonnage of coal on its own lines from the mines reached in southern Ohio, but the fact remains that it is the most important outlet to the lakes and to the west for the mines in the Kanawha, Logan and Kentucky districts on the Chesapeake & Ohio, outranking by a considerable margin the importance of the Chesapeake & Ohio of Indiana and other connections at the western end of the Chesapeake & Ohio.

The Hocking Valley in 1920 handled 11,567,593 revenue tons of coal, of which it originated 6,150,246 tons and received 5,417,348 tons from connections. Of this tonnage received from connections the larger part was received from the Chesapeake & Ohio. The Hocking Valley has generally been regarded as of value to the Chesapeake & Ohio more particularly because of the dividends received (up to this year) from the C. & O.'s holdings of Hocking Valley stock; it is not so generally realized how important the Hocking Valley is to the Chesapeake & Ohio because of its being in reality an extension of the Chesapeake & Ohio's lines.

The operations of the Hocking Valley, due to the predominance of coal traffic, might naturally be expected to be characterized by heavy train loading. The road, however, has gone a bit further than that; it has so worked out its problem that its net tons per train in 1920, including both revenue and non-revenue freight, were the highest of any road in the eastern district, with but two exceptions. The road's net tons per train in 1920 averaged 1,474, being exceeded only by the Pittsburgh & Lake Erie, 1,531 tons, and the Bessemer & Lake Erie, 1,764 tons. The Hocking Valley's average exceeded the Chesapeake & Ohio's 1920 figures of 1,204; the Norfolk & Western's of 1,178, and the Clinchfield's of 1,077, the latter three roads, of course, being in other districts. The revenue train load of the Hocking Valley in 1920 was 1,516 tons; this compared with a figure for 1919 of 1,465 tons. The average revenue tons per loaded car in 1920 were 46.4; in 1919, 43.2 tons.

The Hocking Valley of late has been undergoing considerable in the way of development to increase its capacity and make for more efficient operation. The most important feature of this development is the installation of double track on the main line from Columbus to Toledo. During 1920, nine miles of additional second track was placed in service on the Toledo division between Meredith and Owens and construction of 6.7 miles additional between Marion and Morral is under way. During the year the road acquired 20 Mallet and 10 Santa Fe type locomotives and 500 coal cars.

The operating results in 1920 as compared with 1919 were as follows:

	1920	1919
Mileage operated	350	350
Freight revenue	\$14,616,677	\$9,703,937
Passenger revenue	1,359,410	1,228,282
Total operating revenue.....	17,101,493	11,654,517
Maintenance of way expenses.....	2,028,221	1,329,868
Maintenance of equipment.....	6,627,605	3,935,248
Traffic expenses	118,304	72,203
Transportation expenses	6,692,759	4,109,051
General expenses	476,925	322,538
Total operating expenses.....	15,941,435	9,766,372
Net revenue from operation.....	1,160,059	1,888,145
Taxes	969,614	722,153
Operating income	188,799	1,161,828
Net railway operating income.....	1,577,963	1,258,416

The corporate income account is as follows:

Gross income	\$2,140,889	\$2,702,194
Interest on debt.....	1,733,646	1,460,491
Total deductions from gross income.....	1,795,093	1,672,326
Net income	345,796	1,029,868
Dividends (4 per cent).....	439,980	439,980
Balance to credit of profit and loss.....	9,689,154	9,940,259

Letters to the Editor

Henry Ford, The "Miracle Man"

NEW YORK, N. Y.

TO THE EDITOR:

Why not tell the truth about Henry Ford and his claim of having "worked a miracle" in his six-months' operation of the 400-mile Detroit, Toledo & Ironton Railroad? Which truth is: Mr. Ford has perpetrated a gigantic hoax upon the American public; he has simply executed a very shrewd piece of business buccaneering at great profit to himself of money and self-advertising, but a confidence game that is dangerous to general prosperity and exceedingly costly to other railroads and damaging to the prospect of early rehabilitation of the country's great transportation machine and restoration of the pre-war railroad situation—i. e., for the public the greatest quantity and the best quality of railroad service at the lowest cost ever known anywhere.

In other words, Mr. Ford, by using a colossal international manufacturing concern as a feeder and a club to fatten a tiny 400-mile railroad, threatens serious damage to 250,000 miles of railroad serving the whole country because of the spectacular misrepresentation that, by reducing freight rates, raising wages and shortening hours, together with a few more grandstand plays, he has produced such "efficiency" as to turn a decrepit and losing railroad into a prosperous and popular one within six months. The danger lies in the fact that he is "getting away with it."

The general public today actually believes that Ford has performed a "miracle" (how we love our illusions), despite the explanations of the simple facts. This, because Ford's spectacular affirmative claims "out-punch" the negative explanations, which latter merely prove that there is nothing at all to the story.

Mr. Ford's action in pouring his vast tonnage into his own little line, and then extorting equal or greater tonnage on return trips, from connections which are in competition for this business, is not even new. Andrew Carnegie, a greater business genius, did the same thing 40 years ago when he bought a small railroad which crossed trunk lines and used it as a club to extort differentials from other lines.

If Mr. Ford reduces freight rates 20 per cent on his jerk line, the reduction simply would be turned into the coffers of his own Ford Motor Company and his son's Fordson Tractor Company; if such a reduction by his little line were to precipitate a reduction of even one per cent on all the railroads of the nation, he would profit personally through reduced payments to other lines on his own business.

Approximate figures show that Mr. Ford pays something like \$20,000,000 annually for transportation. About \$5,000,000 of this amount goes to the Detroit, Toledo & Ironton and \$15,000,000 goes to other carriers. A 20 per cent reduction in freight rates would mean a decrease of \$1,000,000 in the earnings of the Detroit, Toledo & Ironton road, but this would not be a loss to Mr. Ford as the amount would remain in his manufacturing business. On the other hand, a 20 per cent reduction on the \$15,000,000 which he pays annually to other carriers would mean a gain of \$3,000,000 to Mr. Ford, as this amount would remain in his industrial enterprises instead of going to the carrier companies which now receive it.

Thus, Henry stands serenely at the receiver's end and gets the money both coming and going, while his publicity propaganda works night and day and the people throw up their hats and marvel at the philanthropic "miracle man."

Radical disturbance of the railroad situation at this critical period of its early convalescence would be a capital crime

against American prosperity. Still, Ford, in his passion for notoriety, is making just those moves calculated to disrupt and retard recovery, confusing the situation and misleading the public.

What Ford's propaganda is calculated to do—if successful in deceiving the public to the fullest extent—is to wreck our entire transportation system, which would precipitate a business calamity.

For this Ford is given a few slaps on the wrist in the form of disputatious and explanatory editorials, while the news headlines of our press carry proclamations of his successive new claims.

Ford once had the militant American public all excited about his "one-man submarine" or "undersea flivver" by which he claimed he would make impotent and worthless the millions of dollars put into armor plate and the great guns of the super-dreadnaughts. This vehicle of publicity he soon discarded in exchange for the more tangible "Peace Ship," Oscar II, with which he transported a cargo of "nuts" to "get the boys out of the trenches by Christmas." The super-dreadnaughts are still being built and larger than ever before, while the boys stayed in the trenches, and would have been still longer in them, and perhaps even brave losers to the Central Powers' military machine, had it not been for the food and munitions which they never could have gotten without the ready war-service of the American railroads, built up by the American brains, energy and character which Mr. Henry Ford now challenges and insults.

A RAILROAD VETERAN.

Epes Randolph, An Appreciation

TO THE EDITOR:

Epes Randolph, president of the Southern Pacific Railroad of Mexico and of the Arizona Eastern, a brilliant field marshal of the Huntingtons and of Harriman, is dead. The unique career of this remarkable man is rich in professional interest and in high-minded inspiration for younger men. Frail of body, but big of brain and warm and stout of heart, he for nearly thirty years worked while fighting off tuberculosis which gripped him in the prime of life. It has been well said that if God Almighty had given him lungs equal to his brains and heart, no railroad men of his generation would have gained wider fame.

Born and reared in Virginia, a descendant of Pocahontas and John Rolfe, marked with the high cheek bones of the Indian, his boyhood and youth fell in the trying period of civil war and reconstruction. His early education was classical before it was professional. His reports and correspondence were models of clear and convincing expression. The great engineer, and America never had a greater, was always blended with the cultivated, modest gentleman, one so truly aristocratic that he was democratic. Magnetic and courtly, he was born to lead, to lead far and to lead well.

His early railway work was as a locating and construction engineer in the south and southwest. In the late seventies when Collis P. Huntington was building the Southern Pacific, Epes Randolph ran the location west from San Antonio while William Hood ran the location east from California. They met at Devil's River, Texas. Soon afterward, Randolph during months of hardship, sought for Huntington a feasible rail line from Texas through Mexico to the Gulf of California.

In the eighties and early nineties Randolph was the Huntingtons' engineering and operating representative in Kentucky, serving with the Chesapeake & Ohio, the Kentucky Central and the Newport News & Mississippi Valley. When Collis P. Huntington was told that the Chesapeake & Ohio could not find a bridge entrance into Cincinnati, he replied, "I have a man who can do it." Randolph built a bridge with a switch back approach. Randolph had become a lead-

ing bridge engineer and built numerous other bridges, including the Louisville-Jeffersonville bridge over the Ohio.

When the Huntingtons and the Vanderbilts some thirty years ago planned a transcontinental system, which never eventuated, Epes Randolph, only turning forty, was selected to head the merged lines. Collis P. Huntington once broke in on a complaint of undue severity toward a subordinate with, "I understand, you mean that I object to these things while I wink at my pet, Epes Randolph, playing poker. Now, when you can do as big work as Epes Randolph you may play poker too."

Unsparing of himself Randolph's health was undermined by hardships in the field and by the air being shut off from a bridge caisson that he was inspecting. One Saturday night the city council of Newport, Ky., passed an ordinance contemplating some speedy track construction by the Louisville & Nashville. Sunday morning at daylight the baffled L. & N. men found Randolph and his gangs on the ground with several hours start. Rain and sleet froze Randolph to his saddle but the track was built.

Taken to California in the early nineties, presumably to die, Randolph lived to make the desert his own and his name a household word in the Southwest and in Mexico. Camped on the desert and nursed by his devoted wife—born Eleanor Taylor of Winchester, Ky., who survives him—sufficient strength returned to warrant acceptance as superintendent of the Tucson division of the Southern Pacific. No executive pronunciamento was needed to make him general manager of his division. Whatever his title or wherever his work, Randolph was ever the idol of the rank and file.

The vanishing frontier welcomed his sublime courage and his peerless leadership. His was a charmed life. It was a tenet of his railroad belief that speed never causes an accident, it merely exaggerates the consequences. If other cars went down the bank, his held the rails. If bad men or Indians shot up a town or camp, the cool and smiling Randolph was not hit. He bore one scar from a wound received while a young militia officer repelling a mob in Alabama.

Six busy, happy years as superintendent rolled by and H. E. Huntington, another great developer, took Randolph to Los Angeles to build and operate the Pacific Electric whose 700 miles give the Southern Pacific the greatest trolley traffic feeder in the world.

In two years the "bugs," as Randolph called his germs, again got too busy and back to Tucson went Randolph, this time to handle the side lines, since become the Arizona Eastern. Randolph headed off the Santa Fe from the Phoenix & Eastern and kept the cañon of the Gila River for a low grade line for the Southern Pacific.

Randolph forestalled the acquisition by the Phelps-Dodge interests of the thirty-five miles of railway from Naco on the border to the big copper camp at Cananca, Sonora. Without authorization he bought the road one Saturday afternoon and drew by wire on E. H. Harriman for one million dollars for the initial payment. Harriman, who had succeeded Huntington, found a lieutenant after his own heart and quickly fell in with Randolph's monumental undertaking, the Southern Pacific of Mexico, to be a part of a west coast Pan-American line from Canada to Patagonia. Randolph built nearly a thousand miles of line in Mexico and added it to the old Sonora Railway. Revolutions have left an unconstructed gap of a hundred miles south of Tepic. When stabilization comes to Mexico this longest branch line in the world will become a through route and in earning power a second Atlantic Coast Line.

Great as are these monuments of engineering and executive achievement, Epes Randolph will be longest remembered as the president of the California Development Company, the creator and savior of the Imperial Valley. He it was who built the dam that by forty-eight hours saved the Imperial Valley from the great flood of the Colorado river. Living in his car and suffering from occasional hemorrhages, his in-

domitable spirit drove the work. One day he found his men struggling with a derailed car. "Throw it in, what better filling do you want?" he ordered. "We cannot stop this work just for cars." Years later during a freshet in the Colorado he directed by wire from Tucson the felling of trees to form mattresses which eddied the current away from weak spots in the banks, a remarkable example of long distance engineering.

Epes Randolph as a railway executive had a profound and scientific knowledge of traffic, finance, politics and statesmanship, as well as of operation and engineering. Bred in the Huntington school of political manipulation, he was the first to see and to meet the changed order of things. He was the first to invoke the referendum against full crew and trainmen's qualification laws. He had the highest trait of the executive, the ability to delegate authority and to trust responsible subordinates.

Courage, brains, integrity, humor, cheerfulness, courtliness and consideration are inherent attributes that can be cultivated and made an unusual and invincible combination. Happy and inspiring was their ripe fruition in the knightly Randolph.

A FORMER STAFF OFFICER.

Are Barge Lines Profitable?

ST. LOUIS, Mo.

TO THE EDITOR:

The following clipping from a St. Louis paper is a good illustration of a half truth, so told as to completely misinform lay readers, and in fact all readers who are not specially interested in the subject matter and do not have more or less complete definite information on the subject.

WASHINGTON, August 9.—The fact that the Mississippi barge line has made \$175,000 profit in the past four months aroused the enthusiasm today of Representative Cleveland A. Newton of St. Louis, one of the foremost inland waterways advocates in Congress and a thorough student of this form of transportation. "This has proved all our arguments," said Newton. "The barge line is making money and the railroads are not, even though the barge line is charging only half what the railroads charge. If the barge line can make this showing, with the difficulty it has in adjusting new machinery, it certainly shows the public what benefit can be gotten from this kind of transportation."

Unquestionably there have been periods and individual trips when the receipts from the operation of the barge lines upon inland rivers have exceeded the out-of-pocket cost of operation, but these figures beyond a question do not take into account the huge overhead expense, insurance of vessels—and possibly cargoes—repairs, depreciation, and all of the other items which a true balance sheet must take into account and show before the man managing the enterprise can determine whether or not it is remunerative. In other words, all statements which I have seen made by the proponents of barge line transportation are unfair to the government and to the taxpayer for the reason that their statement of income and outgo is not complete, accurate and trustworthy.

If the barge lines are profitable when a complete audit of all just and reasonable charges against the business are made, then the government has no business in that business, but it should be turned over to private steamboat companies for their development. If, however, it is unprofitable I am wondering why we should be taxed to take care of the freight which is being transported by certain shippers by barge line to their manifest financial advantage.

It seems to me that the business of transportation should be conducted along the most economical lines. If that can be done by river transportation, then it should be done, although it has seemed to me that river transportation if it is profitable and advisable should be confined to bulky freight which requires a larger amount of space and upon which the time of delivery is not the important factor. If that could be arranged it would relieve railroads of the necessity of transporting those commodities which congest its line and yield a small revenue, enabling them to handle with reasonable expedition, high grade freight, merchandise, etc., which carry the higher rates and in which the time of delivery is most important.

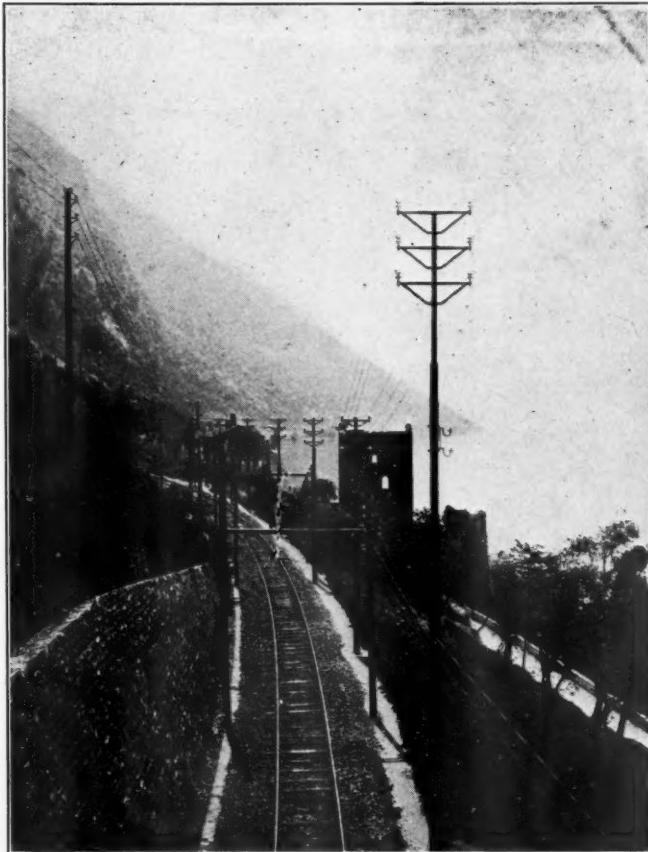
S. A. E.

Electrification Progress on Italian Railways

A Number of Hydro-Electric Plants Are Under Construction, as
Fuel Is Expensive and Hard to Obtain

By Giovanni B. Santi
Engineer, Italian State Railways, Rome, Italy

SINCE FUEL OIL is not produced in Italy, the railway companies, particularly the state railways which operate most of the mileage, and all of the lines where the traffic is heavy, have been engaged for some years in substituting electric traction for steam motive power. The electric power



Line from Lecco to Colico, Showing Wooden Poles Used in 1901 for Supporting the Contact Wires

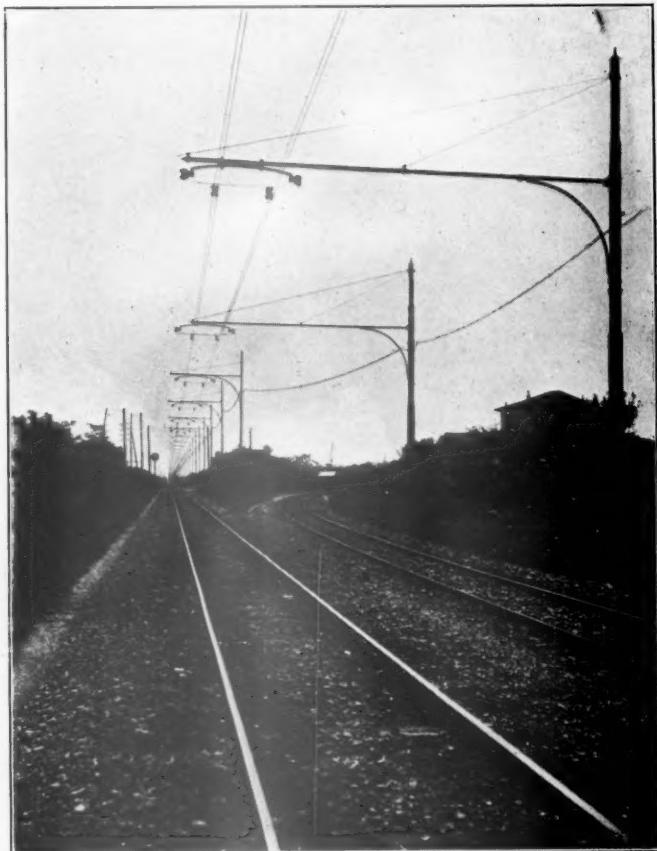
used for this purpose is secured from a number of hydro-electric power plants, and at the present time this number is being increased.

The Development of Electric Operation

The first trial of electric traction in Italy was made in 1901 and in that year the Milan-Varese line and the Valtelline line were electrified. The points between which electric operation was begun were La Lecco-Colico-Sondrio and Colico-Chiavenna. The electrification of the Milan-Varese line was carried out with a direct current, third-rail, using 650 volts. This line has a double track and is 36.7 miles long. It is still being worked with the same power plant which was installed in 1901 and enlarged in 1912 to cope with the increase of traffic. The direct current, third-rail system, gave some trouble during the first month of its operation, particularly on account of the overheating in the

generators. These difficulties, however, were soon overcome to a large extent.

On the Valtelline line the 3-phase system was adopted with a low frequency of 15 cycles and 3,000 volts. The first installation was of an experimental nature and all the details were constructed in a very economical way, particularly as regards the contact line apparatus. Owing to the favorable results of the trial, some parts of the apparatus were strengthened later and at the present time, after a 20-year period of operation, the whole plant is running smoothly. The power is generated at 15 cycles in the power station at Morbegno on the river Adda, close to the electrified line. The copper contact wires are small, conductors having a cross-section of 50 sq. mm. being used for each overhead phase, the third



The Monza-Lecco-Colico Line, Showing the New Contact Wires Supported by Tubular Poles of the Mannesman Type

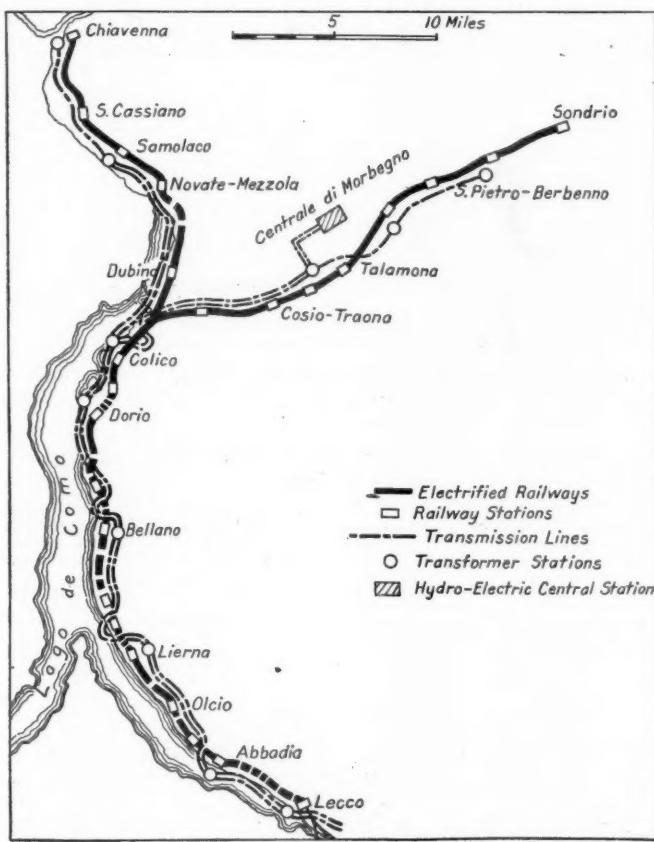
phase being formed by the rails. The poles supporting the catenary were made of wood with transversal suspension as shown in one of the illustrations, except on small sections where two longitudinal types of suspension were tried which were proposed by the firms of Ganz and Westinghouse. The wooden poles were later removed and replaced by Mannesmann tubular construction, also illustrated.

The transformer stations are of low power and are ar-



Map of Italian Railways, Outlining the Electrification Program

ranged in grades along the line with an average distance of about 6.2 miles between them. In 1901, the time at which the Morbegno plant was fitted up, it fulfilled the conditions of maximum economy on the total costs, consisting of interest and depreciation of the plant and cost of maintenance and operation. These conditions of maximum economy have now



Lines Electrified in 1901 from Lecco to Chiavenna and Sondrio

greatly changed, especially on account of the increase of wages and the introduction of the eight-hour day.

The trial on the Valtelline line at once gave satisfactory results. It revealed great advantages in the three-phase trac-

Recent Installations Applied to Lines With Greatest Grades and Traffic

The new installations were made on lines where the traffic was very heavy. Between the year 1910 and the year 1914 the two Giovi lines were electrified. These two lines, which connect the port of Genoa to the inland country across the Apennine mountains, encountering grades of 3.5 per cent, have the largest amount of traffic of all of the Italian roads. The Savona-Ceva line, connecting the port of Savona with the inland country, also crosses the Apennines at 2.5 per cent grade. The Bussoleno-Modane line crosses the Alps. This line has a tunnel 8.45 miles long at an altitude of 4,134 ft. above sea level. It is the chief line of communication between Italy and France.

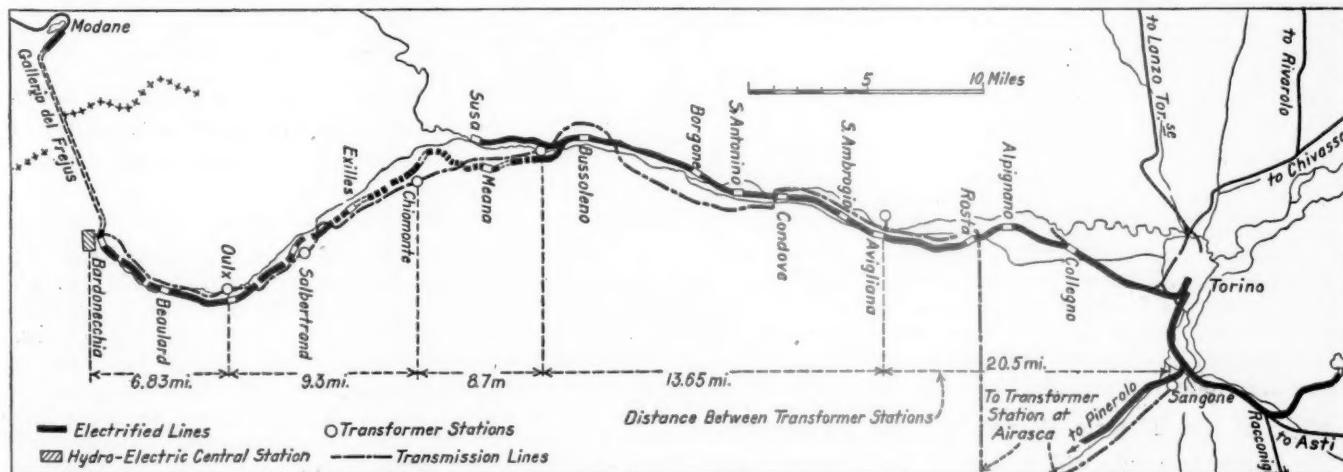
This group of electrified lines in the last few years has carried four times the amount of the average traffic of all the Italian railways. In the statistical year of 1917-1918, for instance, the average amount of traffic per mile of line on the whole of the State Railway system was about 2,060,000 ton-miles, while on the group of electrified lines mentioned above, the amount was about 8,800,000 ton-miles.

In 1916 the coast line between Savona and Genoa was electrified. This line connects the mountain lines referred above to, namely, from Savona to Ceva and the Giovi lines, and allows better use to be made of the apparatus and rolling stock on these lines.

Work in Progress

The electrification of the Pinerolo-Bricherasio-Torre Pellice and Bricherasio-Barge lines, 18.6 miles, will also be completed shortly. This is a continuation of the Torino-Pinerolo line, already electrified. The Torino-Chieri line, 13.7 miles, of which eight miles is double track, has been operating by electricity since March, 1921.

The power transmission lines and the electric transformer stations of the Torino-Pinerolo line were designed to supply either the Torino-Bussoleno line or the other lines which start from Torino, and which are at present in process of being electrified. The European war delayed the work of electrification, although it was never stopped completely, and immediately after the declaration of peace the electrification program was actively renewed. It was possible, therefore, to begin the electric service on the Torino-Bussoleno and Bussoleno-Susa line, 33 miles, of which 28 are double track,



Electrified Line Put in Operation in 1919

tion system, particularly in regard to heavy traffic. This system was adopted, therefore, in the future electrification of the main lines of the State Railways, although alterations were made in all the details in order to render the equipment more technically perfect and more economical, particularly with regard to the maintenance and operating costs.

towards the end of 1919. In this way the Freyus electrified line (Bussoleno-Modane) and the Torino-Pinerolo were linked up awaiting the time when the whole of the electrified lines in Piedmont will be connected to those in Liguria, when the electrification of the Torino-Ronco line is completed, which should be at the end of 1921.

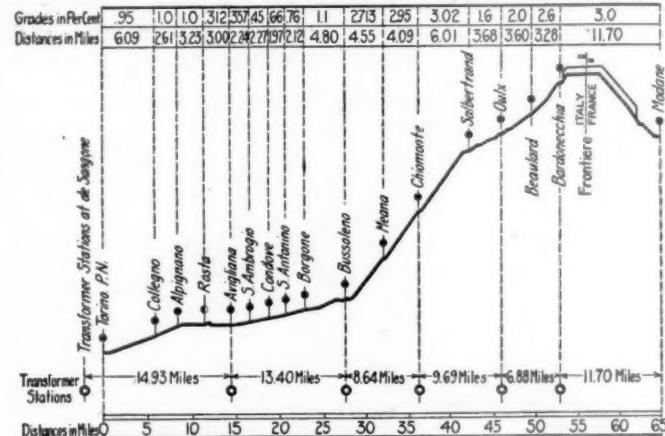
The electrification of the Voghera-Alessandria, Tortona-Nova and Tortona-Arquata lines, which will give access to the Giovi line, and the line from Milan to Chiasso and Switzerland will be completed in the beginning of 1922 at the latest. Nearly all of this work was agreed upon and commenced before the war. It is expected, therefore, that at the end of 1921 the electrified portion of the State Railways (that is the state-owned main lines), will be about 435 miles. As many of the lines have double track, the total length of the electrified section, including junction lines, freight yards, etc., will be about 808 miles. A summary of the more important features of the lines already electrified up to May, 1921, is given in the table.

To these state-owned lines must be added about 124 miles of smaller electrified lines having standard gage track, which are operated by private companies. About 310 miles of narrow gage electrified lines are also operated by private companies.

Plans for the Future

The new work for extending electric traction in Italy, which was decided upon before the war by the State Railways in agreement with the government provides for the electrification of about 2,800 miles of the State Railways. These lines are shown on the full page map. They have been chosen from those where the most coal is consumed on account of the steep grades and very heavy traffic. The total length of line operated by the State Railways is 8,700 miles and the annual consumption of coal is about 2,500,000 tons.

in Central Italy. There are reservoirs in these hydraulic stations to provide a reserve of water for other stations in



Profile of Electrified Line Between Torino, Italy, and Madane, France

time of water shortage. The power which can be generated in these hydraulic plants is as follows:

Station at Melezet	26,000,000 kw. hr. per annum
Station at Rochemolles	40,000,000 kw. hr. per annum
Station at Sagittario	73,000,000 kw. hr. per annum
Station at Reno and Limentre	82,000,000 kw. hr. per annum
Total	221,000,000 kw. hr. per annum

TABLE I—MILEAGE AND CHARACTERISTICS OF THE IMPORTANT ITALIAN ELECTRIFIED RAILWAY LINES AS OF MAY, 1921.

Lines Electrified	Length of Electric Lines										System Used		
	Outside Tunnels		Inside Tunnels		Length of Electrified Track	Maximum Grades (per cent)	Minimum Radius of Curves	Weight of Rail (lb. per yd.)	Voltage	Current	Frequency		
	Single Track	Double Track	Single Track	Double Track									
Lecco—Colico—Sondrio	40.	....	9.25	....	65.45	76.2	1.7 2.0	72 and 55	3,400	3-phase	15 to 16	
Colico—Chiavenna	14.7	....	1.5	....								
Lecco—Monza	18.6	4.3	.3	....	23.2	39.7	1.2	1,640 ft.	72	3,400	3-phase	15 to 16
Milano—Varese—P. Ceresio	8.6	36.4	.25	....	45.25	90.7	2.0	985 ft.	72	650	D. C.	....
Torino—Bussoleno—Modane	10.3	12.8	4.5	37.3	64.9	110.	3.0	1,148 ft.	101	3,900	3-phase	16 to 17	
Torino—Pinerolo	18.3	4.7	....	....	23.	37.9	1.3	1,969 ft.	72	3,700	3-phase	16 to 17
Savona—Ceva	22.6	....	6.	.05	28.65	43.4	2.5	1,312 ft.	101	3,700	3-phase	16 to 17
Ronco—Bivio Rivarolo (via Busalla)	10.9	....	2.9	....								
Campasso—Bivio Rivarolo	1.4	....	....	....	16.9	49.6	3.5	1,312 ft.	101	3,700	3-phase	16 to 17
Campasso—Bivio Succursale	1.7	....	....	....						
Campasso—Sue Scali Maritt.	....	....	....	....					
Genova B—S. Pierdarena	2.7	....	1.9	....								
S. Pierdarena—Ronco (via Mignanego)	7.2	....	7.9	....	19.7	57.5	1.6	1,312 ft.	101	3,700	3-phase	16 to 17
S. Pierdarena—Scali Maritt.	....	....	....	....					
S. Pierdarena—Savona	19.6	....	5.2	....	24.8	31.8	0.7	886 ft.	92.5	3,700	3-phase	16 to 17
Torino—Chieri	13.4	....	....	....	13.4	19.4	1.0	1,640 ft.	64 to 72	3,700	3-phase	16 to 17
Bussoleno—Susa	4.7	....	....	....	4.7	5.2	1.0	1,640 ft.	55	3,700	3-phase	16 to 17
Total	170.8	82.1	27.0	50.05	329.95	561.4	....	....	....	....	....	....

The electrification of 2,800 miles, decided upon in the May, 1920, program, will permit of a saving of 1,300,000 tons of coal, or nearly half of the total amount required for running the entire system. In its place, 600,000,000 kw. hr. per annum will be consumed and this means that power stations will have to be provided with a capacity of 150,000 kw.

Most of the Electric Power Will Be Purchased

The power as a rule will be bought from private power distribution companies, but in order to speed up the work the State Railways have already commenced to build large hydro-electric installations, which will operate in parallel with the power stations of the private companies. These hydro-electric installations are those of Melezet and Rochemolles in the upper Piedmont section near Bardoneche; Suviana and Castrola on the river Reno and Limentre near Bologna, and Anversa on the river Sagittario near Sulmona

It will be possible to generate in the stations at Reno and Limentre, when all the water is used, 127,000,000 kw. hr. more, making a total for all the stations now being built of 221,000,000 plus 127,000,000, or 348,000,000 kw. hr. These figures represent the limit of the annual power available from power stations. Of course, it will not be possible in practice to use this power in full. It must be taken into consideration, however, that the stations will be connected with other industrial power stations, and it will be possible, therefore, to transmit and use the power as it is required. Almost all of these stations are provided with reservoirs of water, and it will be possible to regulate the amount of power taken from individual power stations connected in parallel, so as to make the best use of the entire power system and get a maximum of power with a minimum waste of water. It is expected that the percentage of energy which is available will be about 80 per cent of the total.

Labor Organizations Again Spread Strike Threats

Train Service Brotherhoods and Shop Crafts Announce Preliminaries to a Walkout

PRESS REPORTS of the activity of railroad labor organizations during the past week have given rise to the wide circulation of strike rumors. What has actually happened may be summarized as follows:

The Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Firemen and Enginemen, the Brotherhood of Railroad Trainmen, the Order of Railway Conductors and the Switchmen's Union of North America asked the carriers, through the Association of Railway Executives, to definitely state their position on three requests: (1) to restore the rate of pay in effect prior to the 12 per cent cut of July 1; (2) to withdraw all requests for further wage decreases, and (3) to withdraw all requests for the elimination of time and one-half for overtime. These demands were all rejected by committees representing the carriers in western, eastern and southeastern territories.

Upon receipt of the answers, brotherhood leaders, in accordance with instructions received from their membership following a meeting in Chicago on July 1, met at Cleveland, Ohio, to draw up a ballot for submission to the men. After several days' conference it developed that, although these five organizations agreed that their policy in the future should be put squarely to the membership of the various organizations by ballot, they did not agree on the form in which the presentation to the men should be made. The reports which emanated from the conference room indicated that the Brotherhood of Railroad Trainmen would not agree on the conservative statements to accompany the ballot. As a result four of the organizations prepared a joint ballot and the Brotherhood of Railroad Trainmen prepared its own.

The joint ballot said if the membership rejected the wage reduction "it is to be understood the men will be permitted to withdraw from the service of their respective companies unless satisfactory settlement can be reached under the laws of the organization."

The statement accompanying the trainmen's ballot reads in part:

"All members and others are hereby notified that if the membership vote is in lawful necessary majority to leave the service rather than continue service under the reduced wages now in effect, they will on any or all lines where such vote is secured (with the sanction of the general grievance committee) be given necessary authority by the president of the grand lodge. The president of the grand lodge will not (with the information given above) undertake to prevent the wishes of the men as expressed in their ballot from being adhered to."

The ballots of these organizations will be sent to the men before September 1, and it has been estimated by union officers that it will require a full month or more thereafter to complete the referendum.

Federated Shop Crafts Issue Preparedness Bulletin

The Railway Employees' Department of the American Federation of Labor, comprising the Federated Shop Crafts, has already taken a referendum on the recent wage cuts, and although no official announcement has been made of the result of this vote it has been freely intimated that the returns are overwhelmingly in favor of a walk-out. On top of this vote came the order of the Railroad Labor Board providing that railway employees regularly assigned to necessary Sunday and holiday work should not receive punitive overtime on these days. This decision, together with a summary of the

dissenting opinion which was handed down at the same time by A. O. Wharton, member of the labor group on the Board, was outlined in the *Railway Age* of August 27, page 419. Officers of the Federated Shop Crafts were particularly displeased with this decision and after a three-day conference at Chicago issued a letter to the membership of the six crafts declaring "that these organizations were never confronted with a more critical situation." The letter sounds a warning to the men not to "become involved in an unauthorized stoppage of work," and at the same time declares that an unsatisfactory settlement may make it necessary to "use the full power and strength of these organizations in collective action," and the individual members are therefore requested to "prepare for war" by conserving their personal resources. The local, district and system lodges are directed to "conserve finances by carefully guarding expenditures, and increasing funds to the greatest possible extent."

Pointing to the history of the rules negotiations, both before the Board and on the individual roads, the letter says: "Notwithstanding that management's request (to have the negotiation of rules remanded to the individual roads) was granted, there are but three small railroads on which a complete agreement has been negotiated and signed. On the other hand there are great numbers of disputes from practically every railroad, involving some one or all of the rules.

"There are only 136 carriers named in the decision on overtime, while there were 320 carriers specified in the decision on rules and working conditions (Decision 119). As to the remaining 184 carriers, many are still in conference, and these conferences must be completed, results known and acted upon by the Labor Board before final action can be taken by the organization."

Declare Overtime Decision Not Justified

The recent "middle of the road" decision of the Board recognizing the basic eight-hour day and the principle of punitive pay for overtime with a few modifications from former rules, is declared by the shop crafts to be not justified.

"By no conceivable line of reasoning can Decision 222 be justified, and this body declines to accept it," the report says. "Decision 222 (on overtime) does not give the federated shop crafts even a reasonable basis upon which to approximate the results which will accrue from further decisions of the Railroad Labor Board, as to those rules still in dispute, and which this decision does not dispose of, therefore it would be most unwise at this time to adopt a program looking toward final disposition of only the rules covered by Decision 222, and the federated shop crafts must of necessity defer final action until the Railroad Labor Board has released its decision as to the important rules in dispute."

"This body will take steps to urge the Railroad Labor Board in one decision to finally dispose of all rules which are to be general in their application, in order that the federated shop crafts may have before them at the earliest possible moment the final action of the Railroad Labor Board.

"This body will, therefore, be reconvened at the proper time, and will at that time outline a program for the purpose of securing at the earliest possible moment the position of railroad management on each of the rules decided by the Board that are not acceptable to this body, and the placing of the facts before the membership for vote and final action in compliance with the laws of the organizations."

These developments, together with the direct and implied

threats of labor leaders, have been taken by a large portion of the press as indicating either a general strike or a series of sporadic strikes in which the trainmen and shopmen would be particularly involved.

Opinions as to Strike Probabilities Vary

Some students of labor conditions argue that there will be no strike in the near future because of (1) the unemployment throughout the country; (2) the weight of public opinion against strikes, especially when a mediatory body is functioning; (3) the present relatively high wages of railway labor, and (4) the recognition of labor leaders of the likelihood of failure in view of these conditions. The present strike talk, they say, is but a repetition of strenuous efforts to use the threat of strike to influence the Labor Board.

On the other hand, it is pointed out that the labor leaders have worked themselves into a position where they must either call a strike in accord with the power placed in their hands by these referendums or repudiate their own statements and position at the risk of disrupting their own organizations and being discredited by their membership. Strike talk and dissatisfaction as the result of the propaganda carried on by the reconstructed "outlaw" organizations have gone too far, those who hold the latter view, argue.

The position of those who believe that railroad labor disturbances are impending is bolstered up by the action of the trainmen's officers in preparing a separate ballot for submission to the membership and by the fact that, despite an "unwritten" agreement among members of the Labor Board that no dissenting opinions would be made, Mr. Wharton not only filed one, but quoted the actions and votes in one of the Board's executive sessions. The action of the trainmen's officers is taken as confirmation of estimates as to the effect of the propaganda being carried on by the old "outlaw" yardmen's association. To offset the dissatisfaction of the trainmen with the manner in which their affairs have been handled, officers of the trainmen's organization are forced to take radical steps toward using their economic power, it is pointed out. The action of Mr. Wharton is taken as indicative of the length to which officers of the shop crafts unions will go to retain the substance at least of their national agreement.

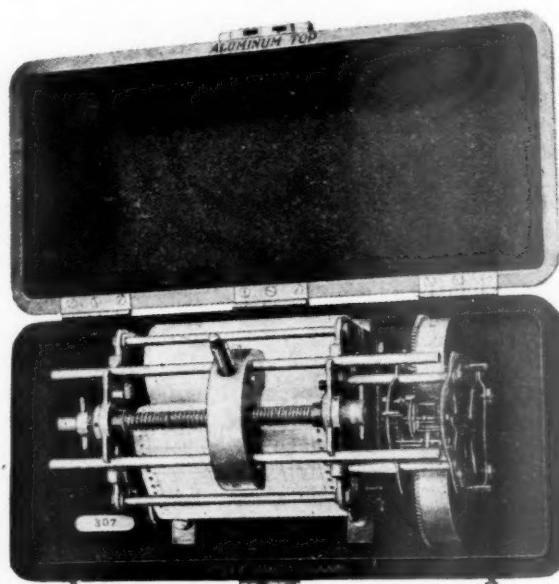
A Check on Rough Handling of Cars

ROAD service tests on a device designed to keep a record of the rough handling of cars have been carried to the point which is said to have definitely established the practicability of the device. They have also shown that most of the rough handling to which cars are subjected occurs in yards during the makeup and breakup of trains and not, as has been claimed by some, in the handling of trains on the road as a consequence of slack adjustments. The particular value of this device arises from the possibility of effecting an appreciable reduction in rough handling.

The device is shown in the illustration. It consists of a spring motor or clock which winds a tape or registering chart graduated to 15-min. periods and designed to give a continuous record over a period of 10 days. This tape records the movement of a pencil attached to a weight which moves between suitable guides under the control of two springs. Any sudden impulse or impact given to the device gives the weight a vibratory motion and thus records marks in a crosswise direction on the tape. The length of these lines as indicating the distance that the weight has been moved from the neutral position near the center of the tape is a measure of the amount of impact sustained.

The first problem which it was necessary to settle before a successful test could be inaugurated was that of determining the limit of rough handling in terms of vibration on the chart of the impact register. This was accomplished through

a series of tests conducted with a view of creating actual cases of rough handling and observing the resulting vibration on the chart of the impact register. Both loaded and empty cars were used, with wood and steel underframes. These were allowed to couple at speeds varying from 2 to 10 miles an hour. Each case was considered from the standpoint of possible damage to a car of merchandise and was accordingly adjudged as being a case of rough handling or permissible handling and the limit of rough handling was decided to be



The Impact Recorder

between two and three miles an hour speed at the time of impact.

After the chart graduation test had been completed, a number of machines were put into use in through merchandise cars operated by the Chicago, Milwaukee & St. Paul between Chicago, Kansas City, Milwaukee, Madison, Minneapolis and Mason City. The machines were in cars operated on a regular loading schedule and were handled at destination by the agent in charge. No traveling inspector accompanied the machines, but their records were removed by the receiving agents and mailed to the general office for investigation and tabulation. The movement of the machines was not advertised and train crews did not know at any time when they might be handling the register. Each case of rough handling which resulted was taken up with the superintendent on whose division it occurred and the crew responsible disciplined therefor.

Studies of records made with the increment recorder indicate, as stated in the opening paragraph, that 97 per cent of the rough handling cases actually occur in yards. The question has been raised whether it is within the limits of reason to expect that cars may be handled under the conditions imposed on railway operation without a certain amount of rough handling. In answer to this it is noted from the record obtained in the tests that 27 out of 111 cars under observation moved from origin to destination over an aggregate distance of 10,000 car miles without a single case of rough handling. There are also repeated instances where cars moving over exactly the same route received widely varying treatment. It is, therefore, estimated that if 24 per cent of the cars can be handled properly under present conditions of transportation with no rigid disciplinary measures in effect, the enforcing of proper discipline would enable the handling of at least 70 per cent of the equipment in the same manner. The impact recorders described above were developed and are being manufactured by the Railway Impact Register Company, Belleville, Ill.

Job Analysis and Job Specification

Showing Advantages to Be Gained from Close Study of
Job and Uses to Which It Can Be Put

By J. C. Clark*

Assistant to General Manager, Oregon Short Line Railroad Company

THE EFFECTIVENESS with which human labor is applied to railroad operation determines to a large degree the safety and efficiency of the service rendered the public, the financial returns to the owners, and the loyalty and contentment of management and employees. To be effective, human labor must be applied systematically, which means that management must decide what work is necessary to properly operate the property and then divide this work in such a manner that each individual unit of the human organization will have a definite task or job to perform. These tasks or jobs must be so related that each job harmonizes with the others to make a perfect whole.

It is obvious that the content of each job and the relationship existing between the various jobs has a vital bearing on the effectiveness with which human labor can be applied. Job analysis is a systematic study and statement of all the duties and requirements of the job, and the modifying factors which surround it.

Purposes of Job Analysis

Railroads employ workmen of a large variety of trades, and the forces are scattered over the entire property. This condition may make the work of job analysis somewhat more difficult but all the more necessary. In the mechanical department the work is largely repair work and each locomotive and car may require different handling and different material. In manufacturing concerns where job analysis has been worked out to a considerable extent, the processes are, as a rule, well defined and regular. This condition does not obtain in railroad shops for the reasons stated.

In other departments where employees come in contact with the public, the personality of the employee is a very important item. In all jobs where the employees have to do with the handling of trains, character and judgment necessary for safety are of the utmost importance. The diversified nature of railroad work as a whole, and the dependence of each department on other departments makes job analysis all the more important, especially as to relationship or co-ordination of jobs.

The purpose for which job analysis is needed will determine the extent of the study necessary. The employment office will need sufficient information to draw up a specification only, but this does not require the detailed study necessary if it is intended to estimate a fair day's work. To be complete, however, job analysis should aim at four principal objects:

First, determine a fair day's work. We have heard considerable of late concerning "A fair day's work for a fair day's pay." But who can say what a fair day's work is? Most wage negotiations in the past have been conducted on the basis of "How much can I get?" rather than upon the basis of "How much am I worth?" Of course the cost and standard of living will always enter into wage negotiation, but the foundation of any wage agreement should be what the work is worth, and what is a fair day's work. There is a great deal that could be said as to the manner of arriving at an equitable conclusion in these matters, but that cannot be

developed at this time. It is possible, however, to determine a fair day's work and what it is worth from a strictly scientific standpoint.

If the Labor Board in Chicago had before it a classified list of all the jobs on the railroad, properly indexed and catalogued, showing all the details of the job and the conditions surrounding it, and a scientific estimate of a fair day's work in each job, would it not be in a far better position to determine an equitable wage? It may sound like a big undertaking, and it is, but wage controversies will continue with all of their disturbing outgrowths until wages are based on facts concerning the job, instead of the present methods.

Second, secure accurate knowledge of the surrounding conditions and the modifying factors. Under this heading would come all the data relative to hours of work, average length of employment, opportunities for promotion, sanitary conditions, and any other matter which affects the job, but is not a part of the job itself.

Third, keep in view the improvement of existing tools and machinery and the devising of new methods or machinery with the object of saving labor or increasing efficiency.

Fourth, determine the effect of employment on the workers. Railroading as a rule is a pretty healthy occupation. However, it would be worth while to study the effect of irregular working hours on trainmen, enginemen and other irregular workers. The hazards of railroad operation would also come under this head, and it should be possible to make an accurate estimate of the hazards of each job, at the same time pointing out methods of reducing these hazards.

Value of Job Analysis

There are a great number of ways in which job analysis would benefit the management, the employees and the public. Any study of this question should include the status of railroad work in the community. A few of the chief values of job analysis would be:

First, to standardize operation. From the standpoint of management, job analysis is needed to determine the best methods of carrying on a job under existing conditions. It will be found that on the same railroad, different methods of performing an operation are used in different shops. This may be due to an established practice of unknown origin or to the preference of some shop superintendent or master mechanic. No matter how the difference in methods originated, each operation should be studied with a view to adopting the best method under existing conditions.

This may apply to other departments than the mechanical. Operations incident to track work, the make-up of trains, the handling of material in the store department, etc., should all be studied with a view to standardizing them.

Closely allied to the subject of standardization is the study of how to improve an operation. By close questioning of employees actually engaged on the job, it will no doubt be found that many operations can be improved upon, either by adopting different tools or machinery, or using different kinds or classes of material.

Second, job analysis will define the responsibilities of each job. At the present time, there may be confusion as to responsibilities connected with a great many jobs and this applies to industry, as well as to railroad operation. This

*For other articles by Mr. Clark on the personnel problem see *Railway Age*, December 31, 1920, page 1157; February 4, 1921, page 329; and March 18, 1921, page 719.

affects both employer and employee and creates a tendency to shift responsibility. If each and every job was accepted by the employee with a definite knowledge of what the responsibilities were, there would be no chance to shift and get out from under it.

Third, a statement of the sequence of operations for a job will be provided. This would apply more particularly to the mechanical department, but would affect to a certain degree employees handling freight in freight houses and material in store houses. It is probable that almost any job is benefited by a statement of this kind, because we all know that it never pays to start a job wrong. There is always a right way to start and that should be plainly indicated, when practical.

Fourth, data will be secured with which to draw up a job specification. The job specification should include the physical qualifications necessary in the worker, such as age, height, weight, sex, hearing, vision, etc.; mental qualifications such as education; experience; ability to speak, read or write English, or other languages; also a brief statement as to the type of mind required.

Next in order would come a complete description of the job itself, which should start with the name of the job and a complete description of the operation. Next would come all of the conditions surrounding the job, then length of time to learn, rapidity of advancement, and chances for promotion. Next in order would come terms of employment, stating the rate, average earnings per month or day, and any other condition relating to terms of employment.

If the specification is to be used as a basis for wage negotiation, there should be included a statement or an estimate of a fair day's work on the job and how it was arrived at. There should also be a statement of methods used in measuring individual progress at the job. This subject was covered in an article in the *Railway Age* of March 18, 1921. If this method of individual progress reports were in use, it would in effect be a statement of the qualifications necessary in the worker.

Another value in job analysis would be to secure data on the amount of output produced by workers of different degrees of skill or experience. This would involve a study of actual performance of various classes of workers and should provide valuable information to assist in the estimate of a fair day's work.

Another important value would be the co-ordination of jobs. The analysis should develop a logical succession at jobs and solve problems dealing with co-operation between departments, gaps in responsibilities, inadequate inspection, etc.

How the Public Would Profit

There are three ways in which job analysis would be of value to the public. The United States Public Health Service, as well as like organizations in the various states and communities, is constantly seeking data on conditions that effect public health. Job analysis should provide definite information on sanitary conditions which affect the occupations and will be of distinct value to the health authorities, and will no doubt be reflected in wise laws governing sanitation and health. This information would also be of value to the various states in administering their employees' compensation laws. Some of these laws are inequitable because based on very meager information. Job analysis would help this situation materially and should result in modification of the compensation laws in some of the states.

The last important value to the public would be to provide data on which to help settle disputes. In a number of cases the public has been called upon to decide labor disputes, and public opinion is always the deciding factor when it comes to a strike or a lockout. Full and unbiased information provided by scientific job analysis would be of immense value in

molding public opinion as to the merits of any controversy and would be of equal value to public representatives on arbitration boards.

How to Proceed

The next question is, "How can all this data be secured?" It is obvious that a very thorough and detailed study would have to be made, which would include the point of view of the employee, the supervising officer, and the general officers. It might be necessary to get the testimony of representatives of the public. It would seem, therefore, that a general committee should be organized to carry on the work, this committee to be composed of an officer of wide experience and ability from each of the major departments, and an employee from each of the major departments. This committee would secure data by personal investigation on the ground, assisted by officers and employees from each division, shop or department, as the case may be.

The committee, of course, would outline a definite program of procedure which would be approved by the executive officer of the railroad. This would be necessary to give the committee proper standing. After the work of analyzing each job had been completed, it would be necessary to continue at least a part of the committee to keep the analysis and specification up to date. Another plan which might be feasible, would be to charge the personnel department with the duty of keeping analysis and specifications up to date, with a periodic survey by the general committee when deemed advisable.

This work is another field in which a personnel department would be of utmost value, and the head of the personnel department should work with the committee on job analysis and job specification and to a certain extent direct its labors. There is no doubt that the job directly affects personnel, and any change in the job means a change in personnel to some extent. It is therefore important for the personnel manager to be in very close touch with the work.

THE CANADIAN BROTHERHOOD of Railway Employees has been expelled from the Trades and Labor Congress of Canada by a vote of 394 to 151. The action was a climax to a long standing dispute over jurisdictional matters. The brotherhood has from 7,000 to 10,000 members scattered over the Dominion. A. R. Mosher, president of the brotherhood, declared that the vote of those favoring expulsion was largely due to abnormal influence brought to bear by interests in the United States.

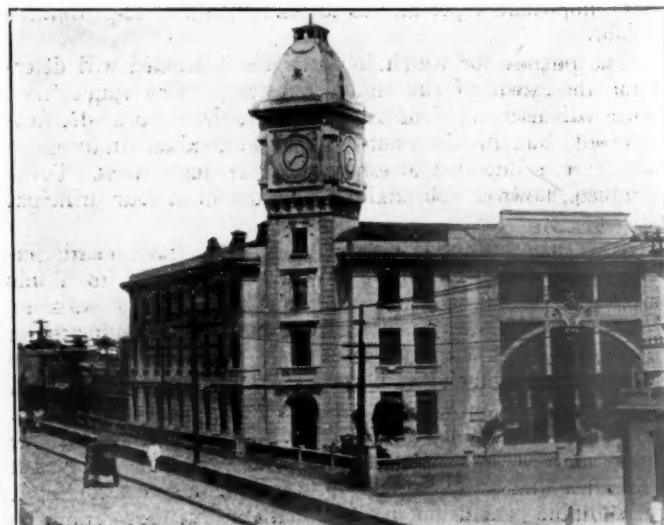


Photo from Underwood & Underwood

Railway Station at San Juan, Porto Rico

Booster Tests on Temiskaming & Northern Ontario

Freight Tonnage Increased 20 Per Cent by Booster—Rapid Acceleration of Passenger Trains

AN INTERESTING SERIES of tests was recently made on the Temiskaming & Northern Ontario of locomotive boosters in freight and passenger service in order to determine their value under the conditions existing on that road. At the present time boosters are applied to one Mikado type locomotive which has 25 in. by 30 in. cylinders, weight on drivers 197,000 lb., and a tractive effort of 45,000 lb. without booster, and to three Pacific type locomotives which

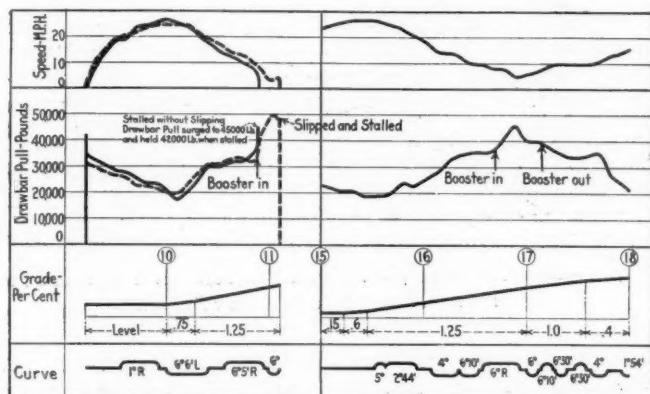


Fig. 1—Booster Test with Mikado Locomotive, Showing Increase in Drawbar Pull

have 23 in. by 28 in. cylinders, weight on drivers 155,000 lb., and a tractive effort of 36,000 lb. without booster.

Dynamometer car 84, belonging to the Canadian National Railways, was used during the tests for obtaining the data. The trial run with the Mikado type locomotive number 150

tonnage for this grade, with this power, is ordinarily 1,200 adjusted tons, so that the excess loading was 301 adjusted tons. The speed of the train when it reached the foot of the 0.75 per cent grade was 26 miles an hour. The full lines in the left hand portion of the chart show the variations in speed and drawbar pull until the train finally stalled on the 1.25 per cent grade, 528 ft. south of mile 11. The locomotive stalled without slipping, the drawbar pull showing as 45,000 lb. The train was then backed down the hill and on the second test the speed was 9 miles an hour when the booster was cut in 660 ft. south of mile 11. The drawbar pull increased rapidly from 33,000 lb., at which figure it was when the booster was cut in to 50,000 lb., but 528 ft. north of mile 11, after the speed had fallen to 3 miles an hour and then picked up to 4 miles an hour, the locomotive slipped and stalled. On backing down and setting off one load, leaving a train of 1,424 adjusted tons—an excess of 224 tons over normal rating—the grade was got over without difficulty.

The train then proceeded to the grade between miles 15 and 18, the result of the booster being cut in on the 1.25 per cent portion of the grade being shown in the right hand portion of Fig. 1. The speed of the train, when the booster was cut in on the hard pull on a 6 deg. curve, was about 9 miles an hour and drawbar pull showed 38,000 lb. As the speed decreased to 5 miles an hour, the drawbar pull went up to 47,000 lb. When the train had gained the 1 per cent portion of the grade and the speed had been picked up to 8 miles an hour, the booster was cut out. In order to get this excess tonnage over these grades, aggregating three miles in length, it was necessary to operate the booster for less than half a mile. The train was then taken through to Englehart, 138 miles north of North Bay, the booster being used on the

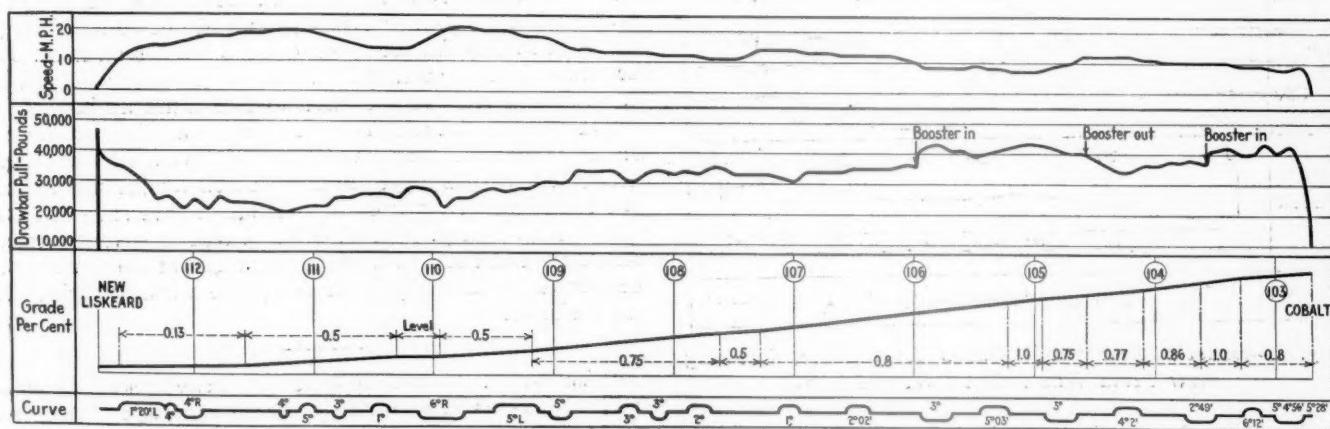


Fig. 2—Booster Test with Mikado Locomotive, New Liskeard to Cobalt

was made north from North Bay. At the start the train consisted of 21 loaded freight cars, the dynamometer car, two official T. & N. O. cars, Temagami and Whitney, and a caboose.

The actual tonnage of this train was 1,401 tons, 756 contents and 645 tare, the adjusted tonnage with the T. & N. O. allowance being 1,501. The left hand portion of Fig. 1, given herewith, shows the performance of the locomotive with this train between miles 9.2 and 11.1. It was decided to see first what the locomotive could do with this train on the 1.25 per cent grade at mile 11 without the booster cut in. The

stiff pulls, with a degree of success equal to that displayed in its performance in the test between miles 15 and 18.

The next day the same locomotive was started from Englehart south with a train of 32 loaded cars, 4 empties, the dynamometer car, T. & N. O. official car Temagami, and caboose. The actual tonnage was 1,800, contents 957, tare 843 and the adjusted tonnage, T. & N. O. rating 1,995. Fig. 2 shows the results of the tests with this train on the grades from New Liskeard, mile 112.8, to Cobalt, mile 102.7. These grades vary from 0.13 per cent to 1 per cent and the normal rating for a locomotive of this class is 1,660 adjusted tons.

so that the excess loading was 335 adjusted tons. The booster was first cut in 100 ft. south of mile 106, when the speed was slightly under 10 miles an hour and the drawbar pull was 36,000 lb. The drawbar pull quickly increased to 43,000 lb. and speed was maintained at about an average of 8 miles an hour on the 0.8 per cent, 1 per cent and 0.75 per cent portions of the grade until the booster was cut out 0.42 mile south of mile 105. When the booster was cut out, the drawbar pull dropped from 40,000 lb. to an average of 36,000; when the booster was again cut in, 0.42 mile south of mile 104, on the 1 per cent portion of the grade, the drawbar pull increased from 37,000 to 42,000 lb., speed remaining constant for 0.6 mile at 10 miles an hour, but dropping to 9 miles an hour on the 6 deg. 12 min. curve, while drawbar pull increased to 43,000 lb. at this speed. The train was thus handled into Cobalt without difficulty, by making the booster operative twice for short intervals on the hardest pulls.

Throughout the tests there was no difficulty in maintaining a constant steam pressure of 180 lb. This was possible because both the Mikado and Pacific types of locomotives used are remarkably free steamers.

Southbound out of Cobalt another load was switched into the train, making the actual tonnage 1,848 and adjusted tonnage 2,048 tons. Fig. 3 shows the results with this train, between miles 26 and 22. The booster was cut in 0.22 mile south of mile 25 on the 1 per cent grade, when the speed was 9 miles an hour and drawbar pull 39,000 lb. As the speed gradually came down to 4 miles an hour while the train approached the summit, the drawbar pull gradually increased until it reached a maximum of 51,000 lb. The booster was cut in again 0.32 mile south of mile 23, on a 1 per cent grade, but not until the speed had decreased to 7 miles an hour, the drawbar pull being 38,000 lb. As the train topped the summit, the speed had decreased to 3 miles

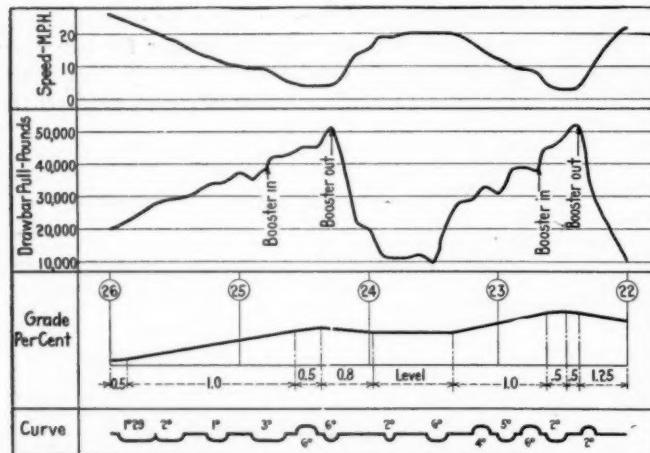


Fig. 3—Booster Test with Mikado Locomotive, Showing How Train Was Taken Over the Top

an hour and the drawbar pull increased to 52,000 lb. The train then proceeded to North Bay.

The tests with Mikado locomotive 150 amply demonstrated the correctness of the proposition that a largely increased tonnage can be handled over a division without difficulty, if it can be successfully got over the few hard pulls of the division, and they demonstrated the ability of the booster in aiding the locomotive to get it over the hard pulls. The T. & N. O. has a profile marked by several short, steep grades which have acted to limit the tonnage handled in the past. By enabling a locomotive to take a tonnage, increased by 20 per cent, over these grades, the value of the booster applied to the freight hauling units of such a railway is at once evident.

Fig. 4 shows the results obtained by tests of Pacific type locomotive 157 in which the booster was used in starting and accelerating a passenger train of 13 cars. The trains were the Canadian National Railways' transcontinental express No. 1 north from North Bay to Englehart, and No. 2 returning. In both cases the train weighed 942.7 tons.

The left hand portion of the diagram was taken when starting the train out of North Bay station over frogs and switches on a 1 per cent up-grade and a 10 deg. curve, uncompensated. Without booster, the tractive power of the locomotive is 36,600 lb. As will be noted from the diagram, the drawbar pull with the booster cut in was 45,000 lb. at the start, 37,000 lb. in 60 sec. when a speed of 5 miles an hour had been obtained; 28,000 lb. in 120 sec. at a speed of

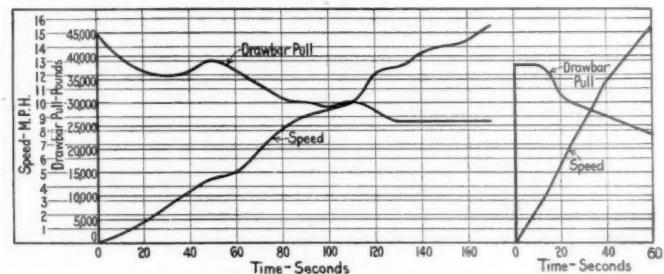


Fig. 4—Booster Test with Pacific Locomotive, Acceleration Curves When Starting Heavy Trains

12 miles an hour, and 26,000 lb. in 170 sec., when the speed was 15½ miles an hour. The manner in which the locomotive handled the train under these conditions was highly gratifying and showed the advantage of the booster as an aid in getting trains to road speed quickly when leaving terminals or after station stops.

The right hand portion of diagram, Fig. 4, shows the result of a test designed to determine the acceleration obtainable on level track. The same train of 942.7 tons was handled north out of Tomiko, mile 27.3, from North Bay, the drawbar pull when lifting the train registering as 38,000 lb. This remained practically constant for 10 sec. as a speed of 3½ miles an hour was being attained; in 30 sec. it registered as 29,000 lb., the speed being 8.5 miles an hour. At the end of one minute, the drawbar pull showed as 23,000 lb. and the speed had increased to 15.5 miles an hour.

Many of the stations and water stops on this road are on grades so that the time saved over the division by the high acceleration of passenger trains obtained by the use of the booster in leaving stations, in addition to that saved on the hills would be large. The T. & N. O. officers have expressed complete satisfaction with the performance of the device and the efficiency shown by it in doing the work for which it was designed.

THREE RIVERS, QUEBEC, announces the arrival there of a vessel bringing 2,000,000 ft. of British Columbia fir, shipped from Vancouver via the Panama Canal. This is the first vessel, it is understood, to make the trip from British Columbia to a Quebec port via the Canal.

AN ITEM FROM SAVANNAH.—Not a day during the month of June did No. 4 (the night express from Atlanta) fail to roll into Savannah on time. No. 4, like No. 3, is manned by crews whose consciousness of duty and knowledge of service have been outstanding factors in the successful operation of these two popular trains. The comfort of travelers in years gone by has been carefully looked after by Chesterfields of the bell cord, while their safety through long, dark, and sometimes stormy nights, has been well guarded by careful hands of men of nerve, who handled the throttle of the giant engines.—*Central of Georgia Railway Magazine*.

Hearings on Western Grain and Hay Rates

Grain-Carriers Show How Desired Reductions Would Impoverish Roads; Small Benefit to Farmers

WASHINGTON, D. C.

THE TESTIMONY of the railroads in the inquiry which is being conducted by the Interstate Commerce Commission on the request of the farmers for reductions in freight rates on grain and hay was heard last week, beginning on Wednesday, with statements presented by L. E. Wetling, manager of the Statistical Bureau of the Western Lines. He said that even in the face of the wage cut made by the Railroad Labor Board and effective on July 1 last such a reduction in rates would cut the net operating income to a point that would bring the annual return to below two per cent on the roads' tentative valuation. Estimating on the nine months ending May 31, 1921, the net operating income of the railroads in the western district from freight traffic would for 12 months be \$143,887,000, or at the annual rate of return on their tentative valuation of only 1.42 per cent. During the nine months referred to, the earnings of the western roads was at an annual rate of 2.78 per cent. If the Interstate Commerce Commission grants this request, this rate of return would be reduced to approximately 1.67 per cent, of which 1.15 per cent would be from freight.

Mr. Wetling declared that the roads in the western district were hit harder by the traffic slump during the first five months of this year than those in any other part of the country, there having been a decline compared with the same period in 1920 of more than 27 per cent. Despite this, he said their expenses increased 7.69 per cent during the nine months which ended on June 1 compared with the corresponding months one year ago. For transporting one ton of grain and grain products one mile, the roads receive an average of 1.10 cents while for all other traffic they average 1.44 cents.

The farmers ought to seek first relief from other industries concerned with the marketing of grain, whose rate of return is much higher than that of the railroads. According to the findings of the Federal Trade Commission, owners of country grain elevators in the western grain states in 1920 realized net returns ranging from 20 to 57 per cent on their investment. The farmers paid the elevator owners an average profit of eight cents a bushel. In some instances they are paying these elevators more than is paid to the railroad. Investigation by the Federal Trade Commission of 1,091 grain elevators showed that on the grain they handled the net return on their investment amounted to 25.33 per cent. One hundred elevators in North Dakota received an average profit of 11.5 cents a bushel and a net return on their investment of 31.34 per cent, while 63 elevators in South Dakota had a profit of 8.24 cents a bushel and a net return of 54.74 per cent on their investment. Investigation by the commission into the operations of eight elevators in Oklahoma showed that they received a profit of 11.93 cents a bushel and had a net return of 57.65 per cent on the amount invested.

From January 1 to July 23 this year, 3,251,455 cars less were loaded with revenue freight than during the corresponding period in 1920 but the number loaded with grain and grain products was 190,530 cars greater than during that period last year, and 120,643 cars greater than in 1919.

The carriers are saving themselves from having operating deficits by greatly reducing expenditures, particularly for maintenance work; but all of this maintenance work must eventually be done. There is little hope of the roads reducing their expenditures for coal before April 1, 1922, when many of them renew their contracts. While, because of the fact that the carriers are compelled to buy their supplies

from 6 to 18 months in advance, it will be some time yet before they can realize anything from the present drop in the cost of materials and supplies.

Fred C. Maegly, assistant general freight agent of the Atchison, Topeka & Santa Fe, testified concerning rates on grain, pointing out that the cost of transporting this commodity is more than for other commodities because of certain services which the roads have to render.

On Friday, testimony was presented to show that even should the low rates on grain and hay be restored, the saving to the farmer would be small while it would result in the loss of millions to the carriers. A. F. Cleveland, assistant freight traffic manager of the Chicago & North Western, showed that the individual farmer in South Dakota, Iowa, Nebraska and Minnesota would be benefited only from \$9 to \$51 on his annual grain crop; while to require the Chicago & North Western to reduce its revenues on these commodities by the amount advanced a year ago, would cost that road \$4,430,194, at a time when the road is not making operating expenses. Should the request of the western states for a reduction be granted the amount saved would only be approximately 1.9 cents on each bushel of wheat; 2½ cents on corn and 1.13 cents on oats. The fluctuation in the market price of grains is far in excess of these amounts. Mr. Cleveland declared that the rates on grain are not such as to interfere with traffic and that that commodity is now being carried for less than other classes of freight. Loss and damage claims resulting from shipments of grain and grain products are heavier than for any other commodity.

F. B. Houghton, freight traffic manager of the Atchison, Topeka & Santa Fe, said that in his opinion a reduction in the freight rates on alfalfa would not stimulate traffic, declaring that feeders in the east would not buy alfalfa from the west when they could get cheaper feed nearer home.

On Saturday, Mr. Cleveland and Frank B. Townsend, vice-president of the Minneapolis & St. Louis, testified that the proposed reduction would only increase the deficits under which many roads are now operating. A reduction of 25 per cent would cause a loss of \$1,414,611 annually to the Chicago, St. Paul, Minneapolis & Omaha, while the annual revenues of the Chicago Great Western would be reduced by \$1,233,951. During the first six months this year, the Chicago, St. Paul, Minneapolis & Omaha had a net operating income of only \$288,737; and the Minneapolis & St. Louis had an operating deficit of \$584,526.

L. T. Wilcox, assistant to the freight traffic manager of the Union Pacific, testifying on Monday, the 29th, denied the claims of grain men that reductions in freight rates on grain and hay would stimulate movement. These assertions have not been borne out by recent experiences of the Union Pacific. Cuts in freight rates on lumber and hay resulted in no increase in the movement of those commodities. Mr. Wilcox presented data to show that grain and grain products were moving freely over the Union Pacific, but that the movement of other commodities had decreased to a considerable extent. One member of the system, he said, was not making expenses by \$250,000 a year, adding that a reduction of 25 per cent on grain rates would reduce the revenues of the line by \$4,781,366. In response to inquiries by members of the commission, Mr. Wilcox said he believed general business conditions were responsible for the diminution of traffic, but added that constant rumors of rate reductions were in his opinion seriously retarding business. He be-

lieved if general business conditions improved, tonnage would move practically as freely under existing rates as it would under reduced rates.

P. J. McCarthy, assistant general freight agent of the Missouri Pacific, said that the proposed reductions of about 25 per cent would cut the revenues of that road \$2,500,000 a year.

On Tuesday, P. H. Burnham, general freight agent of the Great Northern, testified. He estimated that a 25 per cent reduction would reduce the revenues of the Great Northern from the transportation of grain and hay by \$4,167,846. During the first seven months this year, loading of grain on the Great Northern totaled 30,519 cars, 32.8 per cent more than during the corresponding period in 1920. Grain and grain products are moving freely on the lines of the Great Northern under existing rates.

E. W. Soergel, assistant general freight agent of the Chicago, Milwaukee & St. Paul, testified that that road during the first six months in 1921 had an operating deficit of \$2,815,000. If a 25 per cent reduction in rates is made, he estimated that the St. Paul would lose \$4,775,000 annually.

Henry Blakely, freight traffic manager of the Northern Pacific, estimated that the proposed reductions would have reduced the revenues of that road approximately \$3,000,000 during the first six months this year. The Northern Pacific had an operating deficit of \$1,835,000. During the first six months this year 25,173 cars were loaded with grain on the Northern Pacific compared with 23,039 cars in 1920; the total of grain, grain products and hay during that six months was 44,140 cars compared with 57,822 cars in 1920. Mr. Blakely testified that during the first six months this year the Northern Pacific, because of the reduction of receipts expended \$714,500 less for maintenance of way and structures than was spent during the corresponding period last year and \$811,083 less for the maintenance of equipment.

Necessary Prices of Crops If

Farmers Paid Railroad Wages

Commissioner Potter has put into the record a statement from M. O. Lorenz, statistician for the commission, prepared in response to his question as to the effect upon the Minnesota farmer's costs of producing grain if he were allowed the same earning per hour for labor as is paid to railroad employees. Dr. Lorenz says in part:

"According to our latest statistics, the average earning per hour of all classes of railroad employees in the first half of this year was 69.9 cents. Deducting 12 per cent on account of the recent reductions authorized by the Labor Board, the present earning per hour may be taken at 61.5 cents.

"According to the exhibit presented by F. W. Peck, it took one hour of man labor to produce a bushel of wheat. The rate paid was 25 cents an hour. To have paid 61.5 cents an hour would have increased the cost per bushel 36.5 cents. The average freight rate paid by Minnesota farmers to the primary markets is not available but it may be estimated as follows:

"A study for April, 1920, indicated that 6,734 carloads of wheat destined to Minnesota paid \$3.30 per ton. Increasing this 35 per cent, the present average freight charge is \$4.455 per ton or 22.27 cents per 100 lb., or 13.36 cents a bushel. To enable the farmer to pay to his labor in producing wheat the average railroad worker's earning per hour by a reduction in freight rates, would require a canceling of the entire freight charge and in addition a bounty from the railroad company to the farmer of 23.14 cents a bushel. If time and a half for overtime were allowed to the farmer, the bounty would have to be larger.

"In the case of corn, 26 hours are required to produce 40 bushels or .65 of an hour per bushel. To pay the average railroad wage would thus require .65 or 36.5 additional or 23.72 cents per bushel. The average freight rate on corn

computed from the same source as above is 18.22 cents per 100 lbs. or 10.93 cents per bushel. In this case the bounty would be 12.79 cents per bushel."

On Wednesday, August 31, statements were presented by C. E. Spens, vice-president of the Chicago, Burlington & Quincy; S. H. Johnson, vice-president of the Chicago, Rock Island & Pacific; J. G. Woolworth, vice-president of the Northern Pacific; Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, and A. C. Johnson, vice-president of the Chicago & North Western. Mr. Speers, answering a question of Commissioner Potter, called attention to the fact that even though railroad operating expenses were reduced by wage cuts or otherwise, the carriers could not be expected to "hand over" to the shippers the entire savings thus effected so long as the carriers fail to earn the 6 per cent return contemplated by the Transportation Act. But, of course, a large saving in expenses would in all probability be followed by a reduction in freight rates. It would be "impolitic and impossible" to increase other rates in order to make up for deficiencies caused by a reduction on grain and hay; any talk relative to such an increase was "purely academic." Our only hope is that the volume of business will increase. The present low prices on grains are due to the large surplus or excessive supply versus demand. If freight rates are reduced, the movement of grain will be stimulated, resulting in increasing the present available supply; then the prices would naturally continue on a downward trend, and the producer would reap little, if any, benefit, while the Transportation Act would be nullified.

Austria Plans Extensive Electrification

LONDON

DURING 1920 Austria imported 4,800,000 tons of coal, and if minimum requirements are to be met in 1921 about 7,000,000 tons will have to be imported, which will cost about 24,000,000,000 Austrian kronen (\$47,500,000 at the present rate of exchange). This coal comes principally from Czechoslovakia and Upper Silesia. Austria produces about 20 per cent of its requirements, but the coal is of such a poor quality that but little of it can be used on locomotives. On account of the high price of export coal there is every incentive for railway electrification, particularly so because of the large amount of water power available. It is estimated that there is a potential of 2,500,000 hp. to be developed by hydro-electric plants, of which only 205,000 hp. is now being used. By proper development of this source of energy some 6,000,000 or 7,000,000 tons of coal could be saved.

The present economic and financial conditions in Austria permit of only gradual development. On account of the precarious financial situation the government has reduced the credit already granted for the electrification from 1,200,000,000 to 500,000,000 kronen. This and the prohibitive price of certain materials which, because of lack of coal must be purchased abroad, are hampering the progress of the work. Those lines are to be electrified first which have heavy grades and are located far from the coal supply. Facilities for the production of electric current and traffic conditions are also taken into consideration.

On July 23, 1920, a bill passed the Austrian National Assembly which authorized the electrification within a period of seven years of 405 miles out of the 2,780 miles of railway lines administered by the Austrian government. The lines, which are shown on the accompanying map by a dotted line, are:

Innsbruck-German-Swiss border line	146 miles
Salzburg-Schwarzach-Worgl	119 miles
Schwarzach-Villach	73 miles
Steinach-Atttnang	67 miles
Total	405 miles

The bill provides for the expenditure of a sum not to exceed 5,096,000,000 kronen (about \$10,000,000) to be covered by an Austrian government bond issue repayable within 25 years from date of issue. An effort will be made to enlist foreign capital by mortgaging the railways themselves. So far all expenses have been covered by the government without the issue of a loan and without foreign capital, although negotiations with foreign financial interests are in progress.

The bill further contemplates the electrification in a second period of seven years of the following lines, which are shown on the map by heavy solid lines:

Vienna-Salzburg	195 miles
Amstetten-Selzthal	114 miles
St. Michael-Villach	109 miles
St. Veit-Klagenfurt	42 miles
Selzthal-Bischofshofen	11 miles
Linz-Selzthal	61 miles
Hieflau-Vordernberg	65 miles
Wels-Passau	22 miles
Worgl-Innsbruck	50 miles
Total	706 miles

If this is done, 1,111 miles or 40 per cent of the Austrian State Railway will have been electrified. The remaining lines by reason of the peculiar traffic will probably not be electrified at all.

The electrified lines will operate on single phase current at 16 2/3 cycles per second. Power will be transmitted at



Proposed Electrification in Austria. Dotted Lines Show Work to Be Undertaken First, Heavy Lines Indicate Projects for Future

50,000-110,000 volts and transformed to 15,000 volts for the contact wire. It is to be noted that this is the same system in use in Switzerland.

The total available energy is estimated for the electric operation in question at 357,200,000 kw-hr. per year.

The power stations for the Innsbruck Swiss-German border line are the Rutz River station near Innsbruck and the Spuller Lake station near Danoefen. The sub-stations are to be located at Zirl, Rappen, Flirsch and Danoefen. The yearly capacity of the Rutz River power station amounts to 39,000,000 kw-hr.; that of the Spuller Lake power station to 25,000,000 kw-hr. Taking the density of the traffic in 1913 as a basis, the total energy needed from both stations amounts to only 43,000,000 kw-hr., whereby it can be seen that there will be a big reserve for increase of traffic. The Spuller Lake power station is a new plant while the Rutz River station has only to be enlarged.

The Spuller Lake power station, where work was started in September, 1919, will contain 6 units of 8,000 hp. each. At the beginning only 3 units will be used. The hydraulic work is very complicated.

The Rutz River station has at present a capacity of 8,000 hp. and will be enlarged to 16,000 hp. The reconstruction of the Rutz River station will be completed in the spring of 1922. The Spuller Lake power station and the sub-stations

between that place and Innsbruck are to be completed in the summer of 1923. Completion of overhead construction on the line Innsbruck-Telfs is expected for the fall of 1921, that of the line Telfs-Landeck for the winter 1922, Landeck-Bludenz the winter of 1923. By using the energy of Rutz River station electric operation on the Innsbruck-Landeck line is expected to become effective at the beginning of 1923; the electric operation of the Arlberg line between Landeck-Bludenz will probably not be possible before the beginning of 1924.

For the remaining lines to be electrified during the first period, two power stations have been planned, and work has recently been started. These stations are the Stubbach valley power station with 40,000 hp. for supplying the Worgl-Salzburg line, and the Mallnitz power station with 16,000 hp. for supplying the Schwarzach-Villach line. The substations will be located at Westendorf, Hochfilzen, Bruck Fusch, Bischofshofen, Hallein, Hofgastein and Mallnitz. Work is expected to be completed at the latest by the end of 1926.

The electric energy for the operation of the Attnang-Steinach line will be taken from the existing Steg power station near Hallstatt owned by the firm Stern & Hafferl. The necessary work there is expected to be completed at the beginning of 1923, so that electric operations will then be possible.

Of rolling equipment only locomotives are to be secured. So far 27 locomotives—15 passenger and 12 freight—have been ordered from Austrian factories (Brown Boveri, A.E.G., Union and Siemens-Schuckert). This is about one-eighth of the locomotives needed for operation on all lines to be electrified. The passenger locomotives will be of the 2-6-6-2 type and the 2-6-2 type. The 2-6-6-2 engines will operate at a speed of 31 m.p.h. The capacity of these locomotives is about 25 per cent greater than that of the five driving axle steam locomotives now used. They have a rated horsepower of 1,850 at 30 m.p.h. and an overload capacity of 3,000 hp.

The freight locomotives will be of the 0-10-0 type with a rated capacity of 1,000 hp. at an average speed of 18.5 m.p.h. and an overload capacity of 2,000 hp. The cars to be used in the trains operated by electric locomotives will be the same as used for steam operation.

Freight Car Loading

WASHINGTON, D. C.

AN INCREASE of 7,471 in the number of cars loaded with revenue freight during the week ended August 30 compared with the previous week, was shown in the reports of the Car Service Division of the American Railway Association. The total for the week was 816,436 cars. This was a decrease, however, of 151,667 cars compared with the total for the corresponding week last year and 96,773 cars under that for the corresponding week in 1919.

The principal increase, compared with the week before, was in the loading of merchandise and miscellaneous freight which includes manufactured products, although there was a substantial increase in shipments of livestock. Loadings of both coal and grain and grain products, however, were under those of the previous week.

The total number of cars loaded with merchandise and miscellaneous freight was 491,922, which was 12,173 more than during the week of August 13. It was, however, 43,000 less than were loaded during the corresponding week one year ago.

Loading of livestock amounted to 29,110 cars, or an increase of 2,275 cars over the preceding week and 2,000 cars over the total for the corresponding week in 1920. There was also an increase of 150 cars over the week before the loading of coke, the total being 4,436.

Coal loadings, which during the week of August 13 went

up to 158,260, dropped back to 154,140, or a decrease of 4,120. This was 50,000 under the corresponding week last year. Grain and grain products totaled for the week 59,875 cars, or 1,685 under the week before, but 18,237 cars in excess of the same week in 1920 and 7,900 more than were loaded during the corresponding week in 1919.

Loading of forest products totaled 44,583 cars, or a decrease of 750 cars compared with the previous week while ore decreased 572 cars from the week before to a total of 32,370.

Compared by districts, slight decreases under the week before were reported in the Allegheny, Pocahontas and southern regions while all the others reported increases. All, however, were under the totals for the corresponding week in 1920.

Car Surpluses and Shortages

Reports from the Car Service Division of the American Railway Association show that on August 23—491,399 freight cars were idle on American railroads owing to business conditions (surplus cars plus bad order cars over 7 per cent of the total), which was, however, a decrease of 8,195 cars compared with the total on August 15.

Of that total 270,024 were serviceable freight cars while

the remaining 221,375 were in need of repairs. Tabulations showed, however, that the former was a decrease in approximately a week of 14,314 cars while the number of cars in bad order was an increase of 6,119 over the last previous figures received up to August 1.

Surplus box cars in good order on August 23 totaled 79,368 which was a reduction of 5,154 within a week while surplus coal cars immediately available to meet current freight requirements, if necessary, numbered 136,981, or a reduction within the same period of 8,091. Surplus stock cars in good order also totaled 10,714 or 1,317 cars less than were reported on the middle of the month. Of the 2,300,929 freight cars on line of American railroads, 382,440 or 16.6 per cent were reported in need of repairs compared with 376,417 or 16.3 per cent on August 1. In computing the number of cars needing repairs but idle due to business conditions an allowance of 7 per cent is made to represent the number regarded as normally out of service.

The car shortage which has been reported in certain localities principally because of increased demand for grain cars is gradually disappearing, the total on August 23 being 1,376 of which 1,275 were box cars compared with a total of 2,125 on August 15.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, AUGUST 13, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections		
										This year	Corresponding year	1921	This year	Corresponding year	1921
Eastern	1921	9,667	2,599	42,004	979	4,500	2,337	56,879	77,923	196,828	1920	1919	197,496	271,952	228,120
	1920	7,187	2,672	58,979	3,901	8,134	10,580	46,224	100,147	.....	237,824	214,302	.....	.....	.....
Allegheny	1921	3,608	2,897	45,058	2,278	2,463	7,119	43,301	51,637	158,361	.....	.....	107,524	144,240	132,516
	1920	2,815	3,560	65,927	6,152	3,434	12,986	36,667	67,837	199,378	195,959	.....	.....	.....	.....
Pocahontas	1921	174	228	19,521	25	1,150	72	2,646	4,575	28,391	.....	.....	12,908	20,041	13,703
	1920	213	182	25,325	728	1,578	185	2,937	6,055	37,203	35,061	.....	.....	.....	.....
Southern	1921	3,973	1,959	21,856	260	14,335	184	35,543	31,227	109,737	.....	.....	62,124	71,847	61,117
	1920	3,161	1,875	27,117	1,374	19,523	2,678	34,771	40,487	130,986	120,136	.....	.....	.....	.....
Northwestern	1921	16,743	6,594	8,337	431	11,805	21,968	28,745	31,666	129,289	.....	.....	49,238	60,211	46,530
	1920	9,028	6,667	12,666	1,153	18,248	45,814	30,218	39,939	163,733	98,489	.....	.....	.....	.....
Central Western	1921	20,898	9,503	17,222	136	4,943	570	30,000	49,928	124,200	.....	.....	55,342	69,384	61,471
	1920	12,191	9,340	25,366	489	6,446	4,737	32,007	45,282	135,858	124,773	.....	.....	.....	.....
Southwestern	1921	6,557	3,055	4,262	177	6,137	692	15,532	25,747	62,159	.....	.....	45,918	49,939	44,674
	1920	4,113	2,278	6,464	136	8,151	611	17,635	26,899	66,287	53,719	.....	.....	.....	.....
Total, all roads	1921	61,560	26,835	158,260	4,286	45,333	32,942	213,046	266,703	808,965	.....	.....	530,550	687,614	588,131
	1920	38,708	26,574	221,844	13,933	65,514	77,591	200,459	326,646	971,269	.....	.....	.....	.....	.....
	1919	45,651	28,597	167,666	9,534	59,369	20,961	136,340	364,321	.....	832,439	.....	.....	.....	.....
Increase compared	1920	22,852	261	.....	.....	.....	12,587	.....	.....	.....	.....	.....	157,064	.....	.....
Decrease compared	1920	.....	63,584	9,647	20,181	44,649	59,943	162,304	.....	.....	.....	.....	.....	.....	.....
Increase compared	1919	15,909	.....	.....	.....	11,981	76,706	.....	.....	.....	.....	.....	152,439	.....	.....
Decrease compared	1919	.....	1,762	9,406	5,248	14,036	97,618	23,474	.....	.....	.....	57,581	.....	.....	.....

L.C.L. merchandise loading figures for 1921 and 1920 are not comparable to get a fair comparison. as some roads are not able to separate their L.C.L. freight and miscellaneous

August 6	1921	58,622	26,610	147,273	4,218	43,460	32,058	209,336	263,204	784,781	935,730	*872,073	522,247	686,317	596,917
July 30	1921	66,416	25,358	151,089	4,111	44,712	30,103	210,367	264,414	796,570	936,366	*925,195	520,201	694,788	648,690
July 23	1921	64,919	24,689	152,142	3,928	43,126	33,655	208,316	259,573	790,348	928,418	*909,682	503,926	673,219	628,308
July 16	1921	56,991	24,802	152,116	3,737	44,037	31,484	208,079	255,006	776,252	942,851	809,845	484,300	681,684	627,841

*Detail figures for 1919 for Michigan Central not given.

REVENUE FREIGHT LOADED AND RECEIVED FROM CONNECTIONS
SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. FOR WEEK ENDED SATURDAY, AUGUST 20, 1921

Districts:	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Merchandise L.C.L.	Miscellaneous	Total revenue freight loaded			Received from connections					
										This year	Corresponding year	1921	This year	Corresponding year	1921			
Eastern	1921	8,200	2,863	40,908	1,049	4,498	3,259	58,608	79,990	199,375	202,581	.....	267,908	237,680	.....		
	1920	7,426	2,548	54,391	3,531	8,435	10,667	47,174	101,845	.....	236,017	228,099	.....	112,133	147,556	142,890
Allegheny	1921	3,664	2,955	41,098	2,298	2,270	6,878	43,707	55,320	158,190	.....	.....	204,341	204,713	.....	13,098
	1920	2,813	3,307	63,804	8,252	3,543	13,484	38,976	70,162	.....	34,311	36,862	.....	60,613	19,611	18,142
Pocahontas	1921	192	214	18,444	36	1,237	4	2,659	5,226	28,012	.....	.....	128,396	126,997	74,177	69,578
	1920	191	226	22,002	744	1,657	271	2,997	6,223	34,170	20,757	.....	168,096	123,939	.....	62,752
Southern	1921	3,855	1,990	22,638	249	13,920	165	35,968	30,768	109,553	.....	.....	131,422	50,483	.....	55,092
	1920	3,234	2,055	23,800	1,495	18,603	2,776	35,170	41,263	.....	31,266	131,320	.....	71,679	72,761	.....	
Northwestern	1921	18,123	7,692	8,219	421	11,279	20,757	29,354	35,577	131,422	.....	.....	128,396	126,997	74,177	69,578
	1920	11,612	6,802	13,088	1,520	17,828	46,280	30,183	40,783	20,757	168,096	123,939	62,752	61,824	
Central Western	1921	19,724	10,273	18,509	163	5,003	644	30,631	41,180	126,127	131,266	131,320	71,679	72,761	
	1920	12,279	9,810	20,958	416	6,577	4,709	31,405	45,112	131,266	131,320	46,408	49,164	47,670	
Southwestern	1921	6,117	3,123	4,324	220	6,376	663	15,825	27,109	63,757	65,676	61,279	
	1920	4,083	2,350	6,135	230	8,207	653	17,183	26,835	65,676	61,279	540,408	692,847	620,725	
Total all roads	1921	59,875	29,110	154,140	4,436	44,583	32,370	216,752	275,170	816,436	968,103	620,725	
	1920	41,638	27,098	204,178	16,188	64,850	28,840	203,088	332,223	968,103	913,209	620,725
	1919	51,936	31,973	193,824	11,486	66,582	31,621	135,413	390,374	913,209	620,725
Increase compared	1920	18,237	2,012	13,664	57,053	151,667	152,439
Decrease compared	1920	50,038	11,752	20,267	46,470	57,053	151,667	152,439
Increase compared	1919	7,939	2,863	39,684	7,050	21,999	115,204	96,773	80,317

*Detail figures for Michigan Central for 1919 not given.
L.C.L. merchandise loading figures for 1921 and 1920 are not comparable as some roads are not able to separate their L.C.L. freight and miscellaneous

August 13	1921	61,560	26,835	158,260	
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A Large Capacity Locomotive Weighing Plant

Heavy Scale Is Housed in a Special Building with Equipment
for Determining Wheel Loads

By Carl C. Bailey

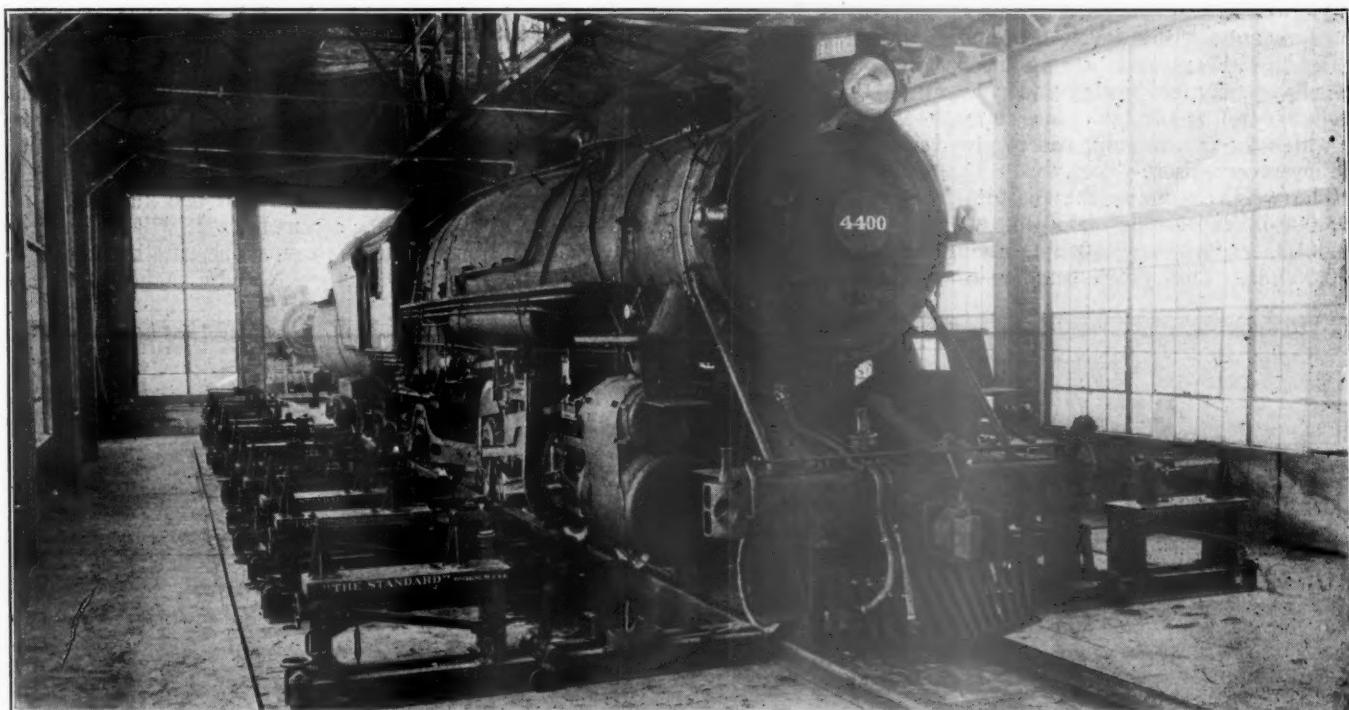
Baldwin Locomotive Works, Philadelphia, Pa.

A LOCOMOTIVE weighing plant was recently completed at the Eddystone plant of the Baldwin Locomotive Works, which unquestionably has yet to be surpassed in size and novelty of construction. It is comprised of a platform track scale, 24 individual wheel scales, concrete scale foundations of massive construction, and a specially designed building which covers and protects the scale and its mechanism. The large scale is composed of six sections, each of which is designed to carry a theoretical concentrated load of 150 tons, making a total working capacity of 450 tons.

Locomotive builders and the railroads in general have long felt the lack of some weighing equipment which would

as previously mentioned, of 450 tons, with a platform of sufficient width to permit the use of individual scales under each wheel. A scale of this type would give accurate results and all weights would be determined with the engine in one location.

In designing the scale the stresses as recommended by the specifications of the American Railway Association, as well as those of the United States Bureau of Standards, were taken into consideration. However, the necessity for rigid limitations on deflection in the longer extension levers, resulted in designs which in many instances give unit stresses very much below specification limits. To conform to these speci-



A Locomotive on the Scales with the Portable Wheel Scales in Position

give them accurate weights and wheel loads, and as a move in this direction the New York Central installed a large track scale at Albany, N. Y., in 1915-16. This track scale has a wooden deck but no provision was made for obtaining individual wheel load weights. The Baldwin Locomotive Works heretofore determined the total weight of the locomotive on a track scale, after which the individual wheel loads were obtained by moving the locomotive to a specially constructed track having concrete foundations of sufficient width to allow the placing of individual scales under each wheel. With this method of weighing, it was difficult to avoid and obtain any degree of accuracy when comparing the weight on the platform with the total weights on the individual scales.

After many investigations relative to the assumed loading of the largest locomotive which it would be practical to build, it was decided to construct a scale having a working capacity,

specifications, the designers were confronted with the question of producing a knife edge in the main levers of sufficient length to give a unit loading not to exceed 7,000 lb. per lineal inch, and also with the problem of supporting it in a substantial manner to secure an even distribution of the load. These knife edges are 22 in. long and are made of a special alloy steel which, when hardened in oil, has an elastic limit of not less than 160,000 lb., and a tensile strength of not less than 200,000 lb. per sq. in. The entire surface of all pivots and bearings throughout the scale is machined, hardened and ground and set in machined ways. All bearing steels for fulcrum stands are set in removable blocks that may be lifted off the stands. These knife edges are so constructed as to have continuous contact with their bearings and there are no bow loops in this scale except those for counter-balancing or back-balancing the weigh beam.

There are 12 cast steel main levers weighing approximately

1,075 lb. each. They rest upon fulcrum stands at one end and are suspended by a stirrup $2\frac{1}{4}$ in. in diameter at the other. From these the massive cast steel yokes that carry the platform are suspended by two heavy machine steel stirrups 3 ft. long and $2\frac{3}{4}$ in. in diameter.

The connection between the middle extension lever and the transverse extension is accomplished by means of two machine steel stirrups $1\frac{1}{2}$ in. in diameter that pass over bearing blocks which engage the butt pivot of the transverse lever and the end pivot of the middle extension lever. These stirrups are then connected by a 2-in. plate which permits vertical adjustment.

The connection between the middle extension lever and the 3-ft. even lever consists of two machine steel stirrups of $1\frac{1}{8}$ -in. diameter that pass over the bearing blocks which engage the end pivot of the middle extension lever and end pivot of the even lever. These stirrups are connected by means of two $1\frac{1}{2}$ -in. plates and two draw bars $1\frac{1}{8}$ in. in diameter. At the fulcrums of both the even and the extension levers, there is an up-pull. These fulcrums are anchored down to the sub-bases by means of two cast steel anchors in the form of an inverted stirrup, one at each side of the lever. Each stirrup is held down by two $1\frac{1}{4}$ -in. anchor bolts, making four bolts to a lever.

The connection between the transverse extension lever and the lever under the weigh beam is composed of stirrups, plates, draw bars and bearing blocks, all so arranged that one lever may be leveled independent of the other, that proper swiveling can take place to match the different angles at which the levers hang, and to give vertical adjustment to the levers in unison.

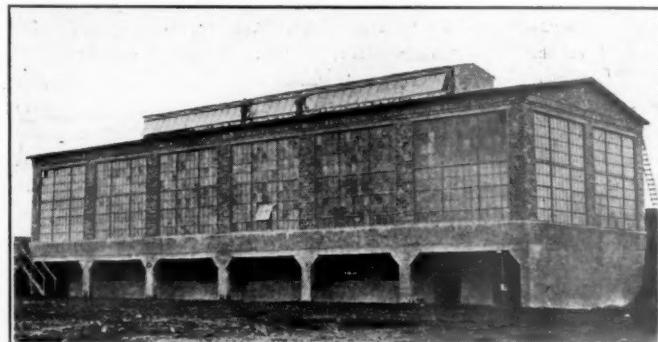
The weigh beam on the platform scale is graduated to 895,000-lb. capacity by 5,000 lb., with an auxiliary beam of 5,000-lb. capacity by 50 lb., giving a total capacity of 900,000 lb. This weigh beam is of "The Standard" type

rocker blocks are made of steel castings and distribute the load uniformly over the entire knife edges.

Individual Wheel Scales

The individual wheel scales were designed and constructed more substantially than the ones previously used in obtaining individual wheel weights. The entire frame work, with the exception of the levers, knife edges, bearing blocks, and a few minor parts, is of structural steel.

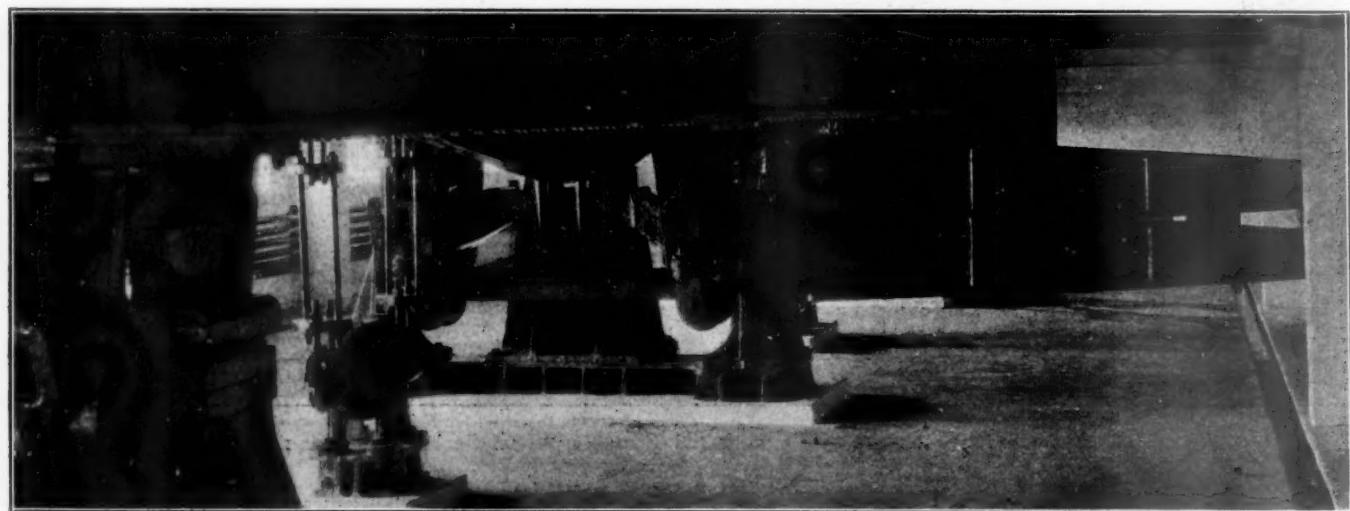
Each individual scale, although weighing 2,310 lb., can



The Scale House Is Largely of Glass.

be moved about easily on two rollers or wheels which can be lowered or raised clear of the floor by means of a lever and screw device. These wheels run on roller bearings and enable the scales to be handled with remarkable rapidity.

Each individual scale is so placed that one knife edge is directly under a wheel of the locomotive. It will be noticed that over this knife edge there is a small bearing block which is placed under the tread of the wheel by planing off one



View of the Scale Mechanism on the Lower Level

with a pin recording attachment. This weigh beam, as well as those of the individual scales, is made of high grade cast iron, fitted with steel inserts for the notches.

The main girders that form the weigh bridge for the platform are constructed of 30-in. 200-lb. Bethlehem girder beams with $\frac{3}{4}$ -in. plates riveted on the top and bottom to increase the section modulus. These girders carry 12-in., 28.5-lb. I-beams placed transversely to form the platform. (It is on this platform that the individual scales are placed to obtain the wheel loads.) The deck is composed of a $\frac{1}{2}$ -in. steel plate riveted to the I-beams.

The suspension pendulums that carry the weigh bridge upon the lever system are adjustable. The bearing and

side of the rail head flush with the web. This bearing block distributes the load over a knife edge of sufficient length to bring the lineal pressure under full load to 7,000 lb. per in.

The locomotive wheel must be raised clear of the track before the weight can be registered on the way beam. To accomplish this, jacks which are raised and lowered by means of ratchets, have been placed on each side of the 8-in. I-beams which form the frame work for the scale. In order that the individual scales may be in alignment at all times, a small level has been placed on the shelf directly under the weigh beam. The capacity of an individual scale is 49,000 lb., increased by an additional 1,000 lb. by 10 lb. on an auxiliary beam, thus giving a total weighing capacity of

50,000 lb. An idea of the accuracy of the wheel scales was obtained in recent tests in which the sum of the wheel loads obtained with the individual scales varied only one-half per cent from the total weight recorded by the platform scales.

For greater convenience, as well as economical maintenance, it was decided to house this equipment in a building specially designed for the purpose and erected on a sloping site which affords entrance from the outside on two levels.

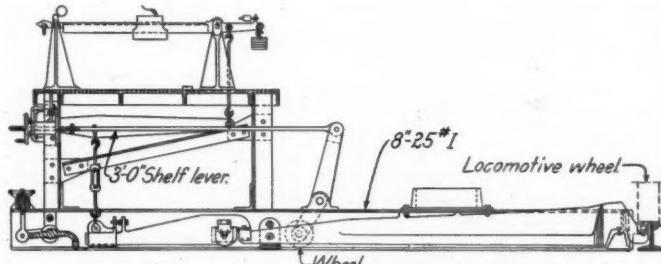
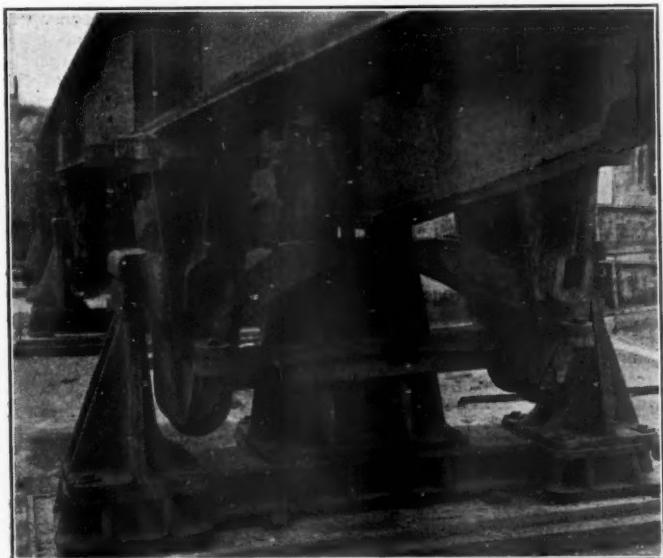


Diagram of the Individual Wheel Scale

The foundations are of concrete, with a concrete mat 110 ft. long, 11 ft. wide and 3 ft. deep, reinforced with 100 lb. rail. In this mat were placed 15-in. 42-lb. I-beams to which the foundation bolts were anchored. The scale-house, as it may be called, measures 122 ft. by 42 ft., and is of hollow tile and steel construction, with steel sash fitted with $\frac{1}{8}$ factory ribbed glass.

Approaching this building there has been constructed a standard gage track approximately 525 ft. long. The curves



A Close View of One of the Sections

on the track are 16 and 15 deg. respectively, connected by a 40-ft. tangent, which allows the checking up of the clearances on the locomotive when rounding a short degree curve.

Designs for the scale and the complete installation of this equipment were worked out and built under the direction of W. N. Haines and D. L. Daly of the Standard Scale & Supply Company, Pittsburgh, Pa., and B. T. Converse and the writer, of the Baldwin Locomotive Works.

A MISSOURI, KANSAS & TEXAS train was robbed near Denison, Tex., on the morning of August 25. Two bandits boarding the mail car as the train was leaving Bell's and immediately covering the mail clerk. They rifled several mail pouches and when near Denison signaled the train to stop and then dropped off. They escaped.

Twenty Systems in I. C. C. Consolidation Plan

NEW YORK papers on Monday and Tuesday last gave in their columns what purported to be an outline of the tentative plan upon which consolidation of the country's railroads may be carried out, as suggested in the report made to the Interstate Commerce Commission by W. Z. Ripley, professor of economics at Harvard University. The Interstate Commerce Commission refused to comment in any way through official channels on the appearance of the supposed plan, but it is understood that an informal investigation is being made to determine the source of the leak. The official report which the Interstate Commerce Commission is directed to make by the Transportation Act—as given in Section 5 of the Interstate Commerce Act—will, it is said, be made public within a short time.

The plan as given in the papers outlines 20 possible systems, but in some cases—notably that numbered 7a—these are alternative. The New England roads apparently presented the most difficult problem of classification. For example, the New Haven is shown as included in the Baltimore & Ohio system and the Boston & Maine in the New York Central system, but a New England system, including all the roads in that region, except the Boston & Albany, is shown; likewise a New England-Great Lakes system which includes the New England roads just mentioned and the Lackawanna, the Delaware & Hudson and the Buffalo, Rochester & Pittsburgh.

No real transcontinental system is made. Northern Pacific and Burlington go together, the Great Northern and the St. Paul, the Union Pacific and the Chicago & North Western, the Southern Pacific and the Rock Island. The outline of the suggested plan of consolidations was given in the Wall Street Journal as follows:

No. 1. New York Central system: New York Central lines, except Lake Erie & Western, Toledo & Ohio Central, Zanesville & Western, Kanawha & Michigan, and Indiana Harbor Belt; Western Maryland, Fonda, Johnstown & Gloversville, Lake Erie & Pittsburgh, Pittsburgh, Chartiers & Youghiogheny, Monongahela, Boston & Maine, Maine Central, Bangor & Aroostook. Note: Boston & Maine, Maine Central, and Bangor & Aroostook may be included in System No. 7 or in 7a. Professor Ripley rejects trunk line treatment of the New England roads, but the commission presents it alternatively to bring out discussion.

No. 2. Pennsylvania system: Pennsylvania, Panhandle, Toledo Peoria & Western, Lorain, Ashland & Southern, Lake Erie & Pittsburgh, Central Indiana, Pittsburgh, Chartiers & Youghiogheny, Monongahela.

No. 3. Baltimore & Ohio system: Baltimore & Ohio, Reading, Central of New Jersey, Cincinnati, Indianapolis & Western, Chicago Indianapolis & Louisville, New York, New Haven & Hartford, Central New England, Lehigh & New England, Lehigh & Hudson. Note: B. & O. Chicago Terminal is reserved for consideration in connection with terminal situations.

No. 4. Erie System: Erie, Delaware & Hudson, Delaware, Lackawanna & Western, Ulster & Delaware, Bessemer & Lake Erie, Buffalo & Susquehanna, Pittsburgh & Shawmut, Pittsburgh, Shawmut & Northern, Lorain, Ashland & Southern, Wabash lines east of Missouri River.

No. 5. Nickel Plate Lehigh Valley system: Lehigh Valley, New York, Chicago & St. Louis, Toledo, St. Louis & Western, Detroit & Toledo Short lines, Lake Erie & Western, Wheeling & Lake Erie, Pittsburgh & West Virginia, Bessemer & Lake Erie.

No. 6. Pere Marquette system: Pere Marquette, Detroit & Mackinac, Ann Arbor, Detroit, Toledo & Ironton, Boyne City, Gaylord & Alpena.

Alternative New England Plans

No. 7. New England system: New Haven, Ontario & Western, Boston & Maine, Maine Central, Bangor & Aroostook, Lehigh & Hudson River, Lehigh & New England.

No. 7a. New England Great Lakes system: Same as above, with addition of Delaware & Hudson, Lackawanna, Ulster & Delaware, Buffalo, Rochester & Pittsburgh, Pittsburgh & Shawmut, Pittsburgh, Shawmut & Northern.

No. 8. Chesapeake & Ohio system: Chesapeake & Ohio, Hocking Valley, Virginian.

No. 9. Norfolk & Western system: Norfolk & Western, Toledo & Ohio Central, Kanawha & Michigan.

No. 10. Southern system: Southern Railway and affiliated lines, New Orleans, Great Northern, Alabama & Vicksburg.

No. 11. Atlantic Coast Line-Louisville & Nashville system: Those two roads and subsidiaries, Western Railway of Alabama, Richmond, Fredericksburg & Potomac, Norfolk Southern, Atlanta, Birmingham & Atlantic, Winston-Salem Southbound, Roanoke to Winston-Salem branch of the Norfolk & Western, Florida East Coast, Carolina, Clinchfield & Ohio, Georgia & Florida, Gulf, Mobile & Northern, Mississippi Central.

No. 12. Illinois Central-Seaboard system: Illinois Central, Seaboard Air Line, branch of Norfolk & Western from Lynchburg, Va., to Durham, N. C., Gulf & Ship Island, Tennessee Central, Carolina, Clinchfield & Ohio.

Big Western Groups

No. 13. Union Pacific North Western system: Union Pacific, Chicago & North Western, Lake Superior & Isheming, Wabash lines west of Missouri River.

No. 14. Burlington, Northern Pacific system: Chicago, Burlington & Quincy, Northern Pacific, Chicago Gt. Western, Minneapolis & St. Louis, Spokane, Portland & Seattle. (Colorado & Southern may be included in system No. 16.)

No. 15. Milwaukee Great Northern system: Chicago, Milwaukee & St. Paul, Great Northern, Duluth & Iron Range, Duluth, Missabe & Northern, Green Bay & Western, Spokane, Portland & Seattle, Butte, Anaconda & Pacific.

No. 16. Santa Fe system: Atchison, Colorado & Southern, Denver & Rio Grande, Western Pacific, Utah Ry., Northwestern Pacific, Nevada Northern.

No. 17. Southern Pacific, Rock Island system—Southern Pacific, Nevada Northern, Chicago, Rock Island & Pacific, Arizona & New Mexico, El Paso & Southwestern, San Antonio & Aransas Pass, Trinity & Brazos Valley, Midland Valley, Vicksburg, Shreveport & Pacific, Chicago, Peoria & St. Louis.

New Southwestern Alignment

No. 18. Frisco-Katy-Cotton Belt system: St. Louis-San Francisco, St. Louis Southwestern, Louisiana Ry. and Navigation Co., Chicago & Alton, Missouri, Kansas & Texas, Trinity & Brazos Valley, San Antonio, Uvalde & Gulf. (Note: M. K. & T. may be included in No. 17.)

No. 19. Chicago-Missouri Pacific system: Chicago & Eastern Illinois, Missouri Pacific, Kansas City Southern, Kansas City Mexico & Orient, Kansas, Oklahoma & Gulf, Texas & Pacific, Ft. Smith & Western, Louisiana & Arkansas, Gulf Coast Lines, International & Great Northern. (Gulf Coast Lines indicates the New Orleans, Texas & Mexico, and subsidiaries.)

It will be noted that a number of railroads, particularly minor roads, are mentioned in more than one group, indicating that the Commission believes the assignment of such properties might be one way or another.

Subsidiaries of Canadian roads, such as the Soo line, are not assigned, the Commission remarking that they are portions of through transcontinental Canadian systems in active competition with systems above set forth. Few Class II and Class III roads are dealt with here but will be considered at the hearings. Water carriers controlled by railroads are considered as tentatively included with the controlling road.

Real Test of Scheme Is Its Ability to Economize in Cost

"After lying dormant for several months," says the Journal of Commerce, in commenting on the plan of consolidations outlined, "the railway consolidation scheme provided for in the Transportation Act of 1920 again reappears as a project of the Interstate Commerce Commission. This time it is in a more fully developed form as the result of work done by an expert, who has been reviewing the whole situation at the request of the commission. The Transportation Act directed the commission to develop plans for the permissive grouping or consolidation of the roads, results to be subjected to public hearing before adoption in any form, and even then to go into effect only as requested by the roads."

Continuing the Journal of Commerce says:

There is thus nothing final in what has been done thus far, and an inspection of the early reports regarding the grouping or rearrangement of the proposed systems of roads does not reveal anything of a very revolutionary character so far as the main outlines are concerned. The apparent consequence of the action proposed or planned by the commission, if followed by the lines, would be that of forcing the surrender of some securities by their present holders and the acceptance of others. Such an interchange

might be called for as the result of the action of large owners of securities and might be inevitable from the standpoint of the small holder unless he were willing to lose his entire investment.

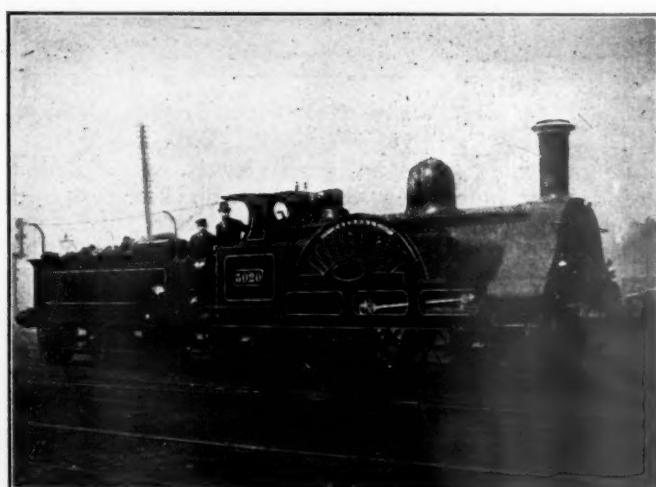
Undoubtedly the time has come for the rank and file of railroad securities holders to consider this merger policy with no little care. The Transportation Act does no more than provide facilities for initiating the new scheme, and considerably more legislation may be needed if the project is eventually to bear fruit. What this legislation should be—whether the community is really ready to submit to the surrender of its ownership of individual railroads and to accept instead ownership in a few systems subject to still closer public control—is a problem of the largest scope. It is offered at a time when the roads are to some extent emerging from the morass of government ownership into which they were plunged during the war, and its immediate effect, should it become practical, might be that of casting still more doubt upon the status of the holdings of those who now own the securities.

The real test of the scheme which is now offered for consideration is its ability to economize in the cost of transportation. If it will save expense it is desirable from the public standpoint, and the effects of it will at least potentially be beneficial to the holders of railroad securities. If there is nothing to be expected on that score there is little use in dabbling further in such experimental plans. Thus far no evidence has been adduced in favor of the consolidation except the assertion, based largely on opinion or conjecture, that savings are feasible. A notable contribution to this phase of the matter is found in the fact that whereas during the war there was close unity and centralization in the operation of the roads, great waste occurred, while since the restoration of the lines to private hands there has been material reduction of expense. Mere consolidation into large units is not likely to bring saving. The basic question, then as now, will be found in quality of management.

From the governmental standpoint it is asserted that the oversight and control of a few large systems would be much easier than the control of the multifarious roads of the present. This is based on the assumption that a change in stock ownership would result in the creation of a few corporate entities, which would be better controllable than a great many independent roads. Probably that is true from the standpoint of mere supervision, but it is not a very strong argument. There is no good reason for remodeling the railroad system of the country merely in order to secure greater ease or efficiency on the part of the Interstate Commerce Commission in the performance of its regular duties.

The whole proposal to fuse the railroad systems has been under discussion for many years, but objections to it have always been so cogent as to defeat it. The scheme went through Congress in a permissive form as a "rider" on the plan for the return of the roads to their owners, but a real and final conclusion regarding it has never been arrived at. Those who in good faith provided for the building of the roads out of their savings and to whom appeal must be made for funds to extend them and keep them up in the future should take the question seriously in hand for decision.

THE DE WITT CLINTON, the old New York Central locomotive, with its train, together with engine No. 999, is being exhibited at the Ohio State Fair, which opened on August 28.



The "Cornwall," London & North Western, 1858—102-Inch Drivers

Ask Accountant's Help in Increasing Efficiency

Operating Officers Can Find Out Efficiency of Organization
by Enlisting Accountant's Aid

By John Collins Owers

MORE MILES per dollar! That is the one aim and object of every earnest railway man today. Whether he be a maintenance of way man, an equipment man, or one concerned directly with operating, all his thought is directed toward the one end, of producing more transportation for each dollar spent; and to reach this goal almost anything that promises to reduce expense is being tried.

Old established passenger trains are discontinued, or their schedules radically changed; business hours at stations are shortened and small agencies have been abolished. Switching shifts are omitted; less track work is done; bridge, building and signal programs are reduced, and equipment maintenance has become in arrears. Urgently needed equipment is not purchased; material stocks are allowed to run low, and many unsatisfactory conditions are permitted to exist; all with the primary object of saving money.

There is no doubt that these efforts are accomplishing the desired result. Expenses, especially payrolls, show tremendous reductions. But who knows positively whether all these cuts have produced 100 per cent economies? Or which of them have not been profitable?

Wages and fuel may be saved when fast freight trains are given slow tonnage ratings, but if, as a result, they run late, lose connections or arrive at their destinations too late for markets so that perishable shipments lie over and meats become tainted, or fruit gets too ripe, or the market falls; what is the net saving? Or if at freight houses, the number of delivery clerks is reduced, and to avoid delay, teamsters pick out their own freight and incidentally take packages belonging to someone else; or supposing that receiving clerks have been dropped with the result that improperly marked or packed shipments are accepted and become damaged or lost in transit, have the wage savings been sufficient to offset the claim agent's settlements?

Payrolls may have been reduced by changed train schedules and restricted business hours, but how have the changes affected revenues? Are people satisfied with the new conditions? Is normal traffic being handled, or has competition been stimulated? What is the net profit or loss?

Questions of this sort need the most careful study. In all the history of railroading there has never been a time when accuracy of judgment in matters of detail was so necessary as at present. We need to get rock-bottom facts in all cases; no one can afford to rely on guess work or rule-of-thumb.

Tell the Accountant

Even if you have never done so before, take the accounting men into your confidence. Let them bring their figures into relationship with your facts, so that you can see in which direction you are traveling and where you are likely to arrive.

The shortest way to get results in this direction is for the operating officers to begin to live in interrogations. Never approve payrolls without demanding to know how much transportation has been produced by the money they have signed away. Refuse to pass statements of expenses without requiring a corresponding statement of what the money has produced, and what each unit of work cost, and how the costs compare with other jobs and the records of other men.

Let them ask the same sort of questions about statements of transportation produced. It is not enough merely to know that passenger mileage or ton mileage has increased, or that the cars or tons handled per locomotive mile are greater than

they were; the officer should insist on knowing whether the traffic has been moved at an economical or profitable figure; and no one should congratulate himself on an apparent good record until it has been put under the acid test of cost and found to be genuine.

Intelligent accounting for expenses and returns will locate specific wastes or uneconomical operations. It will show up inefficient departments, or individuals, and at the same time spur the honest and energetic to still greater effort. This point was interestingly demonstrated recently on a road where a tie installation report was started, on which the results were reduced to the number of ties applied per laborer per day on each section. Each week copies were sent to each foreman. No formal contest was started, nor were "inspiration" circulars used, but a vigorous rivalry immediately developed among the gangs; the low men sought to reach higher places on the list, and the high men to better their positions; so that the tie program, which had been started late, picked up speed and was pushed along at a fine rate, combined with a reduction in cost. Thus a very simple bit of accounting produced returns of a higher order.

Speaking broadly, railroad operations need a generous application of the "factory principle," that Mr. Ford speaks about. The proper measure of a day's work needs to be determined in every department, and for every class of employees and unit of equipment; and where it is not feasible to carry permanent cost systems, irregular "spot" checks should be made, for the purpose of keeping in touch with the results obtained.

Ask the Accountant

Set the accounting men at work! Show them what you desire to find out; aid and direct their search for information, and you will be surprised (and it may be not wholly pleased) at what you learn. Ask them how much track should be surfaced or tamped per labor day; how many square feet a painter should cover and what various structure maintenance jobs have cost; what ratio exists between travel time and actual work hours. Ask them at what cost per unit the extra gangs are working; how many labor hours are lost by terminal delay or by train operation, and how much the loss amounts to. Then you will be able to tell the dispatcher, or it may be your foreman, what he will have to do in the way of improvement.

Ask how many labor hours are required to clean a locomotive fire, and if one, two or more men can work to better advantage; and what the ratio of fire cleaners' idle time to active time may be. Find out how many cars the yard crews should switch per hour, and under what conditions the number of riders should be increased, or an additional engine employed. Ask what tonnage should be given to your freight trains to secure the lowest possible ton-mile cost.

Ascertain what proportion of revenue earnings may be applied to terminal expenses and if the terminal costs are within that figure. Get the relationship between train operating expenses and revenues, and let them tell you what revenue should be obtained to warrant the operation of a new train.

Go into proposals for the purchase of new cars and locomotives along the same line. There will be fewer expenditure authorities withheld, if executive officers can be satisfied that the investment will realize actual savings. Work of this char-

acter, however, must be thoroughly and carefully done. Every element that bears on the problem must be taken into consideration, and all the items of expense and production properly related in order that accurate judgment may be formed. Incomplete and inconclusive figures are almost valueless.

Because by the use of heavier power, the wages cost of operating per ton-mile is lower than when smaller engines are used, it is not correct to assume that a subtraction of the lower rate from the higher will give the net credit. Many other elements enter the consideration, such as delays to other service caused by the heavier trains, drawbar failures, increased consumption of fuel, higher engine-terminal and maintenance expenses and larger capital investment, all of which add perceptibly to the cost, and therefore should be debited to the operation.

The cost of yard switching, freight trucking and fuel handling will be governed largely by the type and capacity of the equipment used. If, for instance, at one station a tractor-trailer system of trucking is in operation, while at another the freight is moved with hand-operated platform trucks, the cost of trucking at station number one should include the value of the tractor equipment, per ton handled. This can be determined by ascertaining the expenses of operating and maintenance of the tractors, including auxiliary equipment or facilities, and adding thereto a proper amount for depreciation and return on investment. Unless these elements are included, an accurate statement of cost cannot be made, and the degree of economy of one system over the other cannot be stated.

Educate the Shirkers

It will also be found necessary to exercise sufficient supervision to insure the accuracy of reports made by employees. Few conductors are above the temptation to insert ditto marks in the tonnage columns of wheel reports; and foremen are notably hard to convince that it makes much difference if they fail to state how much, or for what purpose, material has been used. Careful review and analysis are necessary to locate and remedy errors of this character. The men at fault and also the clerks who compute and distribute the report data need to be taught the inner value of accounting. They need to learn that they are recording live facts, of importance to the well being of their company, not merely piling one figure on another for the sake of a day's pay. They should understand the use to which their work is put and how the figures are related and applied; then it will be found that the work is more accurate and proportionately more valuable.

But beyond and above everything else, get the costs. By hook or by crook, by skill or by main force, know what each job costs. This is one of the secrets of success; it is knowledge that is indeed power, for whoever has accurate knowledge of his operating costs, possesses a power to control results that is well nigh absolute.

The Pennsylvania's Highway Crossing Signals

THE PENNSYLVANIA RAILROAD has put up at a number of road and street crossings in Pennsylvania, New Jersey, Ohio and Virginia a new design of light signal to warn travelers on the highway of the approach of trains, the lights (electric) showing red, both night and day, whenever a train is approaching. The energizing and de-energizing of the light is controlled by the train, in the usual way, through the instrumentality of the track circuit.

The photographic illustrations show two installations, one where the lights are attached to the ordinary highway sign board and the other where they are set on posts in the center of the street, the latter being a view in Haddonfield, N. J.

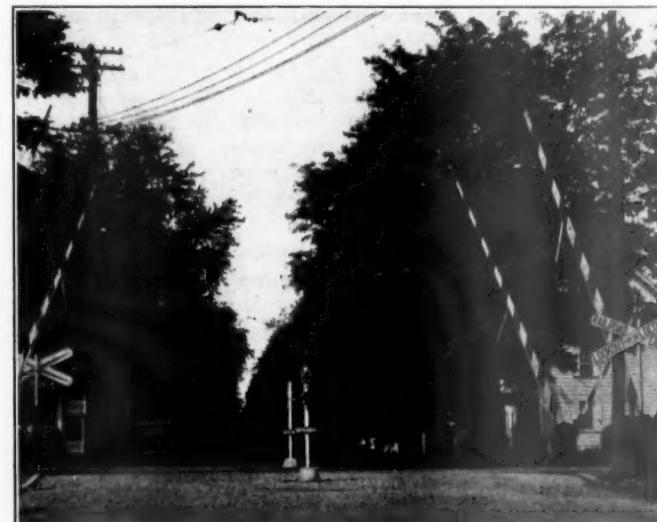
The lights (two) are fixed, one above the other, about 18 in. apart, center to center, and the lower one is 6 ft. 8 in. above the level of the highway. Mounted on an ordinary 3-in. pipe post, the fixtures are adjustable so that the light may be directed toward the highway no matter at what angle the road crosses the railroad. To provide for situations where it may be desirable to set the post on the left of the highway, the reflector, shown in the front-elevation drawing, is adjust-



Highway Crossing Signal, Pennsylvania Railroad

able, and may be turned horizontally to either side. At Haddonfield, where the lights are in the middle of the street and are used as an auxiliary to gate protection, the reflector is, of course, set in the center.

The circuits and batteries are usually arranged so that each of the two lamps is operated independently, to guard against both of them being out at the same time. A peephole is provided in the doors so that the signal maintainer, riding



Crossing in Haddonfield, New Jersey

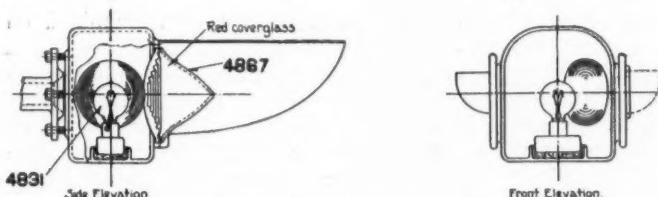
on a passing train, can tell whether or not the lamps are lighted.

The lamp is rebased, so that the concentrated filament in each lamp is in the same position, relative to the pins in the base; and as each receptacle is located exactly the same in relation to the lens, the lamps are interchangeable in all signals, without further adjustment.

A 12-volt lamp, consuming about $5\frac{1}{2}$ watts, is sufficient to give a good indication in bright daylight. Each complete

signal consumes only 11 watts, or 22 watts at a crossing. With the reflector properly adjusted, a driver approaching on the highway can see the indication until he is almost opposite the signal.

The standard lettered sign of the Pennsylvania, shown in



Light-Signal for Highway Crossing

the illustration, is of cast iron, with arms 8 ft. long, and is mounted on a 3-in. pipe post. The middle of the sign is 11 ft. above the ground.

Accident Investigations—

April, May and June

THE EIGHTH quarterly issue of the summary of train accident investigations, prepared by the Bureau of Safety of the Interstate Commerce Commission, which is for the months of April, May and June, 1921, was issued on August 24. This report covers 18 accidents, as follows:

Derailment...Cincin., N. Orleans & Tex. Pac.	New River, Tenn.	April 6.
Derailment...New Orleans & Northeastern...	Moselle, Miss.	April 16.
Derailment...Boston & Maine...	Woodsville, N. H.	April 25.
Derailment...Pennsylvania...	Bennington, Pa.	April 27.
Derailment...Columbus & Greenville...	West Point, Miss.	April 30.
Collision...Norfolk & Western...	Welch, W. Va.	May 3.
Collision...Washington, Balt. & Annapolis.	Ferndale, Md.	May 5.
Collision...New York Central...	Elkhart, Ind.	May 7.
Derailment...Missouri Pacific	Almont, Ark.	May 7.
Derailment...Chicago, Rock Island & Pacific	Forrest City, Ark.	May 12.
Derailment...Texas & Pacific...	Eagle Flat, Tex.	May 13.
Collision...Chicago & Alton...	Shirley, Ill.	May 15.
Derailment...Louisville & Nashville...	Solway, Tenn.	May 19.
Derailment...Charleston & Western Carolina.	Beech Island, S. C.	May 20.
Collision...Pennsylvania...	Burlington, N. J.	May 29.
Collision...Louisville & Nashville...	Theodore, Ala.	June 2.
Derailment...Baltimore & Ohio...	Medora, Ind.	June 8.
Collision...Detroit, Jackson & Chicago...	Warsaw, Mich.	June 18.

Following are abstracts of these reports:

The train derailed at New River, Tenn., on the 6th of April, was the northbound Royal Palm Limited, No. 2. Three coaches were nearly overturned and 5 passengers were killed. Over 70 passengers, one employee and three other persons were injured. The train was moving at about 40 miles an hour on a curve of six degrees when the locomotive was thrown off the track at a point where the outside rail was not properly supported, the track being under repair at the time. Three steel passenger cars were badly damaged by coming in contact with rocks projecting from the bluffs on the outside of the curve. The inspector says that the repair men were putting in new ties and increasing the elevation of the outer rail on the curve; and it appeared that the ties had been properly tamped on the inside of the curve but not under the ends of the ties at the outside. The section foreman was a man of long experience and good record.

The train derailed near Moselle, Miss., on the 16th of April, was the southbound New Orleans Limited, No. 41. Moving at about 15 miles an hour, the locomotive and three cars ran off the track at a point where the roadbed had been washed out by a sudden flood, and the engine and one car were overturned. The train consisted of one locomotive and nine cars. Two coaches and four sleeping cars remained on the track for several minutes, but the roadway was constantly being washed away, and after a short time two of these cars were overturned, fell down about seven feet and were partly submerged. One passenger was killed and two passengers and three trainmen were injured. The inspector finds that

this accident was due to a cloudburst; the evidence given at the inquiry indicating that the rainfall, causing the rising of a small stream, was the greatest ever known at that place. Train No. 55 had passed over the line a few minutes ahead of No. 41. Two drains under the track proved insufficient to relieve the flood.

The train derailed at Woodsville, N. H., on the 25th of April, was a northbound freight. Moving through a crossover of about 15 deg. at low speed, one of the two engines of the train ran off the track, and the engineman was killed. Three employees were injured. The inspector found that a number of derailments had occurred at the same place, and that the locomotive in question was of such design that it ought not to be operated over curves of more than 10 degrees. There was no speed limit in force, and the condition of the track was only fair.

The train derailed at Bennington, Pa., two miles east of Gallitzin, on the 27th of April, about 10 p. m., was eastbound passenger No. 64. The locomotive was overturned but 9 cars remained upright. The fireman was killed and the engineman fatally injured. All other persons on the train escaped with slight bodily injuries, all of the cars being of steel. The derailment occurred on a curve of 8 deg. 38 min. and the inspector found it due to excessive speed. The permissible rate at this point is only 30 miles an hour, while the train was running probably at 40 m.p.h. or faster.

The train derailed near West Point, Miss., on the 30th of April, consisted of two locomotives moving backward and eight cars. While running at about 25 miles an hour, down grade, one of the engines was derailed and both locomotives were partially overturned. Two enginemen, one trainman and one ex-employee (classed as a trespasser) were killed and two trainmen were injured. The inspector concluded that the cause was excessive speed on uneven track.

The train involved in the collision at Welch, W. Va., on the 2nd of May, was a local passenger, moving backward. While running at about 15 miles an hour on a curve the train ran over a misplaced switch and collided with a string of coal cars standing on a side track. Two coaches were crushed. Six passengers were killed and 41 passengers and one employee were injured. The switch was left wrong by track repairers. The lookout was inefficient. The report of the inspector on this collision was noticed in the *Railway Age* of June 17, page 1418.

The butting collision on the Washington, Baltimore & Annapolis electric road at Ferndale, Md., on the 5th of May, was between a passenger train and a work train. The motorman of the work train was killed and 10 passengers and 13 employees were injured. The time-table had been changed a few days before, and the men in charge of the work train, trusting to memory as to the frequency of passenger trains, encroached on the time of passenger train No. 339 without right. The passenger trains had been running every half hour, and some of them were taken off; these men neglected to examine the time-table.

The collision at Elkhart, Ind., on May 7 occurred in the course of switching in the freight yard about 4 a. m., two employees being killed. The inspector found that both of the victims were riding on the footboard of the tender when there was no necessity therefor; and that the conductor had provided no lookout when a car was being pushed by the locomotive.

The train derailed at Almont, Ark., on the night of the 7th of May, was the westbound Sunshine Special, No. 201. Moving at about 30 miles an hour the train was derailed at a facing point switch, misplaced, and the locomotive was overturned. The fireman was killed and four persons were injured. The switch lock had been broken and the switch light covered. The inspector reports the engineman as saying that he temporarily misjudged his location.

The train derailed on the Chicago, Rock Island & Pacific

near Forrest City, Ark., on the 12th of May, was eastbound passenger No. 626 of the St. Louis Southwestern, consisting of a locomotive and six cars. Moving at full speed the locomotive was derailed at a misplaced switch and, with the first two cars, was overturned. The engineman was killed and 12 passengers and two employees were injured. The switch, a facing point, had been left open by track repairers. It had been run through by a westbound passenger train. There was a good view and the failure of the engineman to see the target is unexplained. The inspector reported that possibly the engineman of No. 626 had had his attention diverted by an automobile which was racing with his train.

The train derailed near Eagle Flat, Tex., on the 13th of May, was a westbound freight. Four trespassers were killed and five were injured. The train was moving at about 30 to 40 miles an hour, on uneven track, when the 22d car was derailed, with the consequence just noted. The inspector reported the cause as excessive speed, the limit imposed by the rule being 25 miles an hour.

The train involved in the accident at Shirley, Ill., on the night of the 15th of May, was westbound passenger No. 9. Moving at about 40 miles an hour, it ran over a misplaced switch and collided with freight cars standing on the side track, badly damaging the locomotive and the two cars next behind it. Six passengers and four trainmen were injured. The switch had been maliciously misplaced, the switch lamp having been changed to show all-clear.

The train derailed near Solway, Tenn., on the 19th of May, was northbound passenger No. 32. Moving at about 40 miles an hour the locomotive was derailed and with the first three cars was overturned. The engineman was killed, the fireman fatally injured and two other trainmen less seriously hurt. The derailment occurred at a point where track men were resurfacing and was reported by the inspector as due to the weakened condition of the track. A number of new ties had not been spiked. The track foreman, a man of 17 years' experience, had had a flag out but had called it in, evidently misjudging the strength of the track.

The train derailed on the Charleston & Western Carolina near Beech Island, S. C., on the 20th of May, about 3 a. m., was eastbound express No. 38 of the Atlantic Coast Line. Moving at about 20 miles an hour the locomotive was derailed and overturned, and with the first two cars fell down a bank. The engineman was killed and two passengers and three trainmen were injured. The train was deliberately wrecked, one rail having been taken out.

The trains in collision at Burlington, N. J., on the 29th of May, at about 8.28 p. m., were northbound local passenger No. 2714, which was just starting from the station, and a following extra excursion train, 11 cars, heavily loaded, the excursion train running into the local at about 30 miles an hour. The two rear cars of the local, both wooden coaches, were telescoped into each other. Two passengers, one of them a train dispatcher, and both employees of the Pennsylvania, were killed and 31 passengers were slightly injured. The railroad at this point lies in the street and there was a great uproar, pedestrians, seeing that a collision was impending, shouting wildly. The excursion train had run past a manual block signal, set against it. This collision occurred at a point where the two main tracks converge into a single track. The leading train had been traveling on the left-hand track, and had stopped at the station with a part of the train fouling the switch at the end of the double track. The line is straight for about two miles, and the engineman of the extra said that he had been watching the markers on the other train, which was a short distance ahead of him; and he passed Edgewater Park, two miles back, and a slow board, 1600 ft. back, without being aware of his location. He was running at about 50 miles an hour and did not apply brakes until he came close to the home signal, a short distance back from the point of collision. The light from the

open fire-box door is the only reason given for missing the signals at Edgewater Park; and the engineman said that as he approached Burlington he was still thinking that he was in the vicinity of Edgewater Park. The fireman was equally oblivious to the landmarks. The report of the inspector says that the fireman had made only one trip on this division before this day, and that he had never been examined on the rules; although he had been in the service more than a year. The inspector gives no information about the engineman; but he had been a runner for over three years.

The trains in collision at Theodore, Ala., on the 2d of June, were northbound passenger No. 2 and a preceding freight (No. 78), the passenger running into the rear of the freight at full speed as it was entering a side track. The engineman of the passenger train was killed and the fireman and three other persons were injured. The caboose and three cars of the freight train were wrecked. This collision occurred about 12.20 a. m. The engineman of the passenger train had a good view of the tail lights of the freight for 3,300 ft. and the inspector is unable to find any explanation of how the engineman failed to apply brakes. The primary responsibility is placed on the freight for not providing flag protection and for starting out from the last preceding station with insufficient time to reach Theodore in time to clear the passenger train ten minutes, according to the rule. No block signal system was in use. The flagman of the freight had been in the service 37 years, but it was found that he could neither read nor write, although he said that he could tell the time of trains as shown in the time-table. The inspector found that the flagging and spacing rules were not rigidly observed on that division of the road.

The train derailed at Medora, Ind., on the 8th of June, about 2 a. m., was an eastbound freight, drawn by two locomotives. Both locomotives and 17 cars were wrecked, including seven cars of cattle. Three employees were killed and two were injured. The train was moving at about 35 miles an hour. The derailment was caused by a switch which had been run through in the wrong direction and was loose.

Five persons were killed and 24 injured in the rear collision of westbound interurban cars on the Detroit United Railway at Warsaw, Mich., on June 18. A wooden car was telescoped by a steel car. The inspector found that the motorman of the second train was negligent in controlling speed on a descending grade. The leading train was standing on a side track and the other one, which was the second section on the same schedule, approached at uncontrollable speed. In his service of two years the motorman had a record of numerous cases of disobedience of rules, including one rear collision.



Photo by Underwood & Underwood

Fence Erected Along Mexican Border as an Impediment to Liquor Smugglers

Who Pays the Man for Waiting on the Bench?

Many Railroads Could Effect Economies by Adopting a
System of Interviewing Supplymen

By Grant Gibson

DOES THE RAILROAD executive show his "bigness" or his "smallness" by practicing procrastination in interviewing salesmen? Who pays the bill by reason of the salesman being put off by that much abused phrase "tied up in conference"? What can and should be done to meet and overcome this condition? These are indeed pointed questions and should be given considerable thought by railroad officers.

Sales Expenses

One railroad supply concern, doing about \$400,000 business annually, keeps a sales organization of eight men. These men cover the central and eastern railroads and expend approximately \$60,000 for traveling expenses and salaries. Fifteen per cent of the total sales must therefore be given over to the sales department. Who pays this? Why, the railroad! This traveling expense is an overhead and in order that the supply people may live the railroads must pay. Sales expenses should not exceed 7½ per cent, or, in other words, the railroads purchasing from this small supply concern must pay \$30,000 extra each year to secure its goods. The figure seems small until one stops to think of the thousands of railway supply companies that sell to these same railroads.

Without doubt millions are wasted annually from two principal causes. First, money expended in entertainment. Graft is a harsh word, but when one stops to think even a cigar handed to a prospective customer is graft on a small scale. (The cigar bill for the eight men previously mentioned averaged \$182.65 monthly during 1920.) It appears that the successful salesman handling a line of railway supplies is the man who always hands out the smokes and who says, "How about going out to lunch with me," "Let's go to the ball game this afternoon," or "Bring the madam downtown to dinner and I'll get some tickets for a show." Don't forget the railroad pays these bills.

Unnecessary Delays Are Costly

The second wasteful practice is making a bench warmer of the salesman and constantly putting him off until tomorrow, day after tomorrow or a week hence. When the official passes out word that the salesman should drop in later there is only one thing for him to do and that is come back at the appointed time. He may be put off again and again, but he dare not fail to show up for fear of incurring the displeasure of the man to whom he wants to sell. The railroad salesman may never put over his proposition and still be in good standing with his concern provided he gets to see his man, but woe to him if he fails to get by the closed door. Therefore, he is going to come back and, if he is a successful salesman, he will keep coming back until he breaks down the barrier that has been keeping him out. But the railroad settles the bill!

Does the man in the private office fear that if he invites the salesman in immediately upon the card being presented that the salesman will assume he has an easy mark? If so, the officer is mistaken. How much better it would be if word were passed to the salesman that although the boss was busy, he (the salesman) could have 10 or 15 minutes' time and if that was not enough it would be well for him to come in some other time. This would give the salesman a chance and should he take advantage of his invitation to come in and

stay over his time limit then he is not due any further courtesy. (It is agreed that a great many salesmen are very much in need of instructions in deportment.)

Another balm which would satisfy the salesman would be for the officer to step out of his private office, shake hands, politely inform the salesman of his inability to give him time and make an engagement for a conference at a later date and then mark this engagement on the calendar, and keep it if at all possible. This gives the salesman an opportunity to handle business in the interim and is a legitimate excuse to his employers as to the necessity of his staying over a day or two. Putting off the inevitable (the salesman) merely wastes time. He is going to come back, and the railroad certainly pays for this.

A certain road department officer has become so imbued with this put-off attitude towards salesmen that it has become a habit with him and even when heads of other departments (lesser lights) are invited into conference at a certain hour they have to join the bench warmers for an hour or two before getting in. This officer was representing his company in entering a contract with an outside engineering contractor to take over certain railroad work. The outside man (one of the biggest) was invited to attend a conference in the officer's office at 9 a. m. on Monday. He travelled 17 hours to keep the appointment and was on hand at the specified time. The private secretary took in the card and came out with the information that it was impossible to see Mr. Contractor that day; make it 9 a. m. tomorrow. Again he showed up and again was requested to come in later. After three appointments he was received on Saturday morning and the business was wound up in less than half an hour. This was not only unfair to the individual but to the railroad as the railroad will pay this bill.

Little Courtesies Count

One railroad officer does not believe in making his reception room comfortable. Hard benches and dim lights are in vogue. Why? He believes that by making the salesman comfortable he will become a frequent caller. Another never invites the salesman to have a seat when he calls; if he sits down he is liable to stay too long. Still another seldom invites a salesman into his private office but comes out and stands up to the railing to talk business, even though several other salesmen may be present.

Some railway officers are of the opinion that courteous treatment to the man who sells would result in not having any time to conduct the business of the railroad. This condition would actually exist unless the problem were systematized the same as other problems are. System is needed above all. Lack of it is responsible for the statement that the salesman is a necessary evil.

A Satisfactory Arrangement

One purchasing agent has a well planned system and it is really surprising to note the simplicity with which it works out. Immediately upon entering the reception room one is greeted with a neat placard which reads: "The Purchasing Agent will receive salesmen between the hours of 9 and 12 a. m. (except on Saturdays), unless by appointment." The rule is inflexible. The salesmen come in and are received in the order of arrival. If the calendar for the morning looks

big it is suggested to them that they be as brief as possible.

The purchasing agent personally handles the major dealings and several assistants the minor ones. But the salesman on his first call is invited in to see the big boss. He is given ample time to state his proposition and if the purchasing agent is interested and the proposition is of minor importance the salesman is courteously referred to one of the assistants. Each and every salesman is given his opportunity. Suffice to say, if he is handling an article of merit and his price is right he can sell.

The principal advantages of this system are: First, the purchasing agent is not constantly interrupted throughout the day receiving visitors. Second, his superiors and subordinates are aware of the hours devoted to salesmen and seldom if ever interrupt him. Third, the uniform treatment of all salesmen disarms criticism. It does not take long for the news to travel through the selling fraternity that a certain salesman can always get an audience with Mr. So-and-So. Fourth, the cost of selling to this company is naturally reduced and if every railroad executive would adopt a similar system there is absolutely no reason why prices would not be reduced and the railroads would not have to pay excess baggage.

A New Ticket Printing and Recording Machine

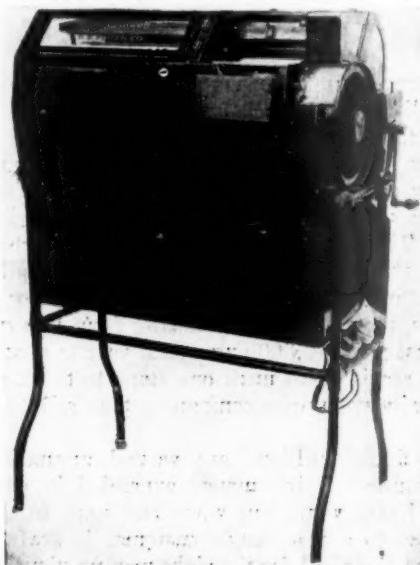
A NEW DEVICE has recently been perfected by J. W. Hubbard, president of the United States Switch Company, Eau Claire, Wis., for printing and recording local and inter-line tickets as sold on steam and electric railroads, which makes it unnecessary to carry a stock of local ticket forms. Each ticket is produced on safety ticket paper which is inserted in the machine in the form of a roll, the paper being fed forward for the proper space and then cut off automatically as each ticket is produced. The entire printing is done in the machine, the roll being merely a blank strip of safety paper. The ticket turned out in this machine shows on its face the number, date, destination, price, routing, name of the issuing line; the customary statement showing the time within which the ticket must be used, and the name of the general passenger agent of the issuing line. A coupon, which is attached to every ticket, is perforated so that it can be conveniently removed when desired by the first conductor.

In addition to producing the tickets themselves, the machine makes a complete record of each sale. This statement, which is automatically printed on a record sheet, gives data for every ticket, including its number, the exact number of miles from issuing point to destination, routing, rate, war tax and the number of miles and the rate applying to each state through which the passenger travels. The ticket is produced and delivered on a small shelf near the right hand end of the machine and the record is printed near the top of the left hand end on a roll of paper which can be removed at the end of the day's business. A glass door at the upper left hand corner of the machine, through which the record is withdrawn, has a bottom edge which serves as a knife, and on being closed, cuts off the daily record from the roll, which is left in place in the machine.

In making a ticket, the operator takes hold of a small knob fitted into the right end of the machine and by turning in either direction, indexes the machine to the desired destination. When this operation has been performed, it is necessary only to press an electric button in order to produce a ticket with all the customary printing and at the same time to make the complete record and ticket charge distribution. When the machine is to be used in smaller stations where no electric current is provided, the ticket and record are pro-

duced by making one complete turn of a crank fitted into the right hand end of the machine. Tickets are numbered in consecutive order automatically as they are produced and each ticket is dated on its face instead of on the back. When the ticket seller finds it necessary to sell a ticket some days in advance, he can make use of a dating device on the machine which enables him to adjust an individual ticket for any date desired. Trials have proved that tickets can be produced, delivered to the patron, and change made as rapidly by the Hubbard machine as under the old system of ticket racks and windows.

Very few working parts are involved. At the same time the completeness of the device is demonstrated by the fact that when a change in rate is announced, the printing drums can be removed by a simple operation and new drums carry-



The Hubbard Ticket Printing Machine

ing the correct rate can be inserted. The printing drums are light in weight, being of aluminum construction, and are easily handled. The United States Switch Company, which will handle the distribution of the machines, will market them in several different sizes. The smallest machine will carry 50 stations, the next larger 150 stations, a third size 300 stations, and the largest size to be carried in stock will print tickets for 600 destinations although it is possible to secure a machine on special order which will carry any number up to 1,200 stations.

The new device, it is said, will effect large savings for ticket departments by doing away with all local ticket stocks. Its use will also prevent the sale of tickets out of numerical order and will make it impossible to dispense any tickets without a complete record of the transaction, together with the price received. The use of the machine makes such errors as overcharges or undercharges in the price of tickets nearly impossible, since the passenger sees for himself the price, including the war tax, on the face of the ticket. The date is also included on the face instead of on the back as at present, so that the conductor can see at a glance the date when the ticket was sold. The machine is also of advantage to auditing and statistical departments, since the record it produces can be accepted by these departments without checking, not being liable to any errors which an agent might make.

THE UNITED STATES Department of Agriculture has sent west a carload of exhibits to be displayed at state fairs at Sedalia, Mo.; Milwaukee, Wis., and Topeka, Kan.; and at Wichita, Kan., in connection with the international wheat show.

General News Department

The Telegraph and Telephone Section of the American Railway Association will meet in Cleveland, Ohio, at the Hotel Cleveland on September 21, 22 and 23.

The Southern Pacific is installing telephone train dispatching circuits in Texas and Louisiana; 20 stations on the Louisiana Western, 30 on Morgan's Louisiana & Texas, between Echo, Tex., and New Orleans, La., and 27 stations on the Houston, East and West Texas, between Houston and Shreveport. All are to be equipped with Western Electric apparatus. Telephones are to be installed at a number of blind sidings.

The Bridge and Building Supply Men's Association held a meeting in Chicago on August 25. Arrangements were made to receive applications for membership and space for the exhibit of this association to be held at the Hotel McAlpin in New York City on October 18, 19 and 20, in connection with the convention of the American Railway Bridge and Building Association. A. J. Filkins, 3346 S. Artesian avenue, Chicago, is secretary.

The question of resuming hearings in the general railway investigation before the Senate committee on interstate commerce has been postponed, to be decided at a meeting of the committee following the Congressional recess. There is some sentiment in the committee for discontinuing the hearings, but strong pressure is being brought by others to hear testimony from the labor and other interests not represented at the hearings so far.

The American Association of Railroad Ticket Agents held its annual convention at St. Paul, Minn., last week. A resolution was adopted to the effect that the members believe the Government ought to accord them a higher classification than that of "clerks." The president of the Association for the ensuing year is F. J. Burton and the secretary, W. G. Fershel, both of Chicago. It is intended to hold the next annual convention at Savannah, Ga.

Chairman Clark Ends Career with Commission

Chairman Clark of the Interstate Commerce Commission completed his work with the commission on August 31 and prepared to engage in his new work in private practice on commerce matters in Washington. His successor on the commission, Frederick I. Cox, was expected to take the oath of office on Thursday and enter upon his duties.

Mr. Clark has given a statement that the speculative rumors that friction between the President and the commission or between the President and himself had anything to do with his resignation have no foundation in fact. He said he was controlled entirely by personal reasons and that the President not only expressed regret that he wanted to retire but asked him to withdraw his resignation and even after he had accepted it gave him an opportunity to withdraw it. He also said the President has not in any way indicated any desire or disposition to dictate to or direct the commission or even to suggest how the commission should act in any matter before it.

Railway Earnings for July

Preliminary compilations of railway returns for the month of July, the first month since the wage reduction took effect, show an improvement over previous months. The net operating income for 172 roads was \$57,254,000. In June all the Class I roads earned about \$51,000,000. To earn at the rate of 6 per cent, all the Class I roads should earn about \$90,000,000 for July. The total operating revenues of 172 roads show a decrease of 13.1 per cent, while their operating expenses show a decrease of 29 per cent.

For the 10 months since the rates were increased last year Class I roads have earned a net operating income of \$368,093,000, according to a compilation by the Bureau of Railway Economics. This is at the annual rate of 2.5 per cent on the valuation tentatively fixed by the commission for rate-making purposes. For the first six months of 1921 the roads earned \$141,000,000, or 1.8 per cent. For the 10-months period the average under a 6 per cent return was \$516,977,000.

Franco-Canadian Exhibition Train

To advertise the life and industries of France, a traveling exhibition, occupying eight cars, is now being shown in the principal cities of Canada. The train was at Montreal August 20. Its itinerary includes Three Rivers and Quebec and thence to Toronto. It will complete its journey at Montreal on November 4.

The eight exhibition coaches are assigned as follows: First coach, "La Pensee Francaise" (The French Thought), which will include some of the finest treasures of French art and literature as well as relics of the wars of France. Second and third coaches: Industrial exhibits, including travel, photography, civil engineering, mines and mineral products, mechanics, etc.

Fourth coach: "La Mode," including dresses, silks, laces, etc. Fifth coach: Leather industries, chemical products, drugs, perfumes, electrical appliances, brushes, toys. Sixth coach: Agricultural, horticultural and alimentary products. Seventh coach: Decorative art, bronzes, watches and clocks, jewelry and cutlery.

Too Much Regulation

"The fact is that under government regulation, of railroads or of any other business, the power of control is given almost entirely into the hands of men who are ignorant of the practical problems of the enterprise. Some of the regulators have studied books on the subject—law books and theoretical treatises—but few of them know anything about the subjects from practical experience. This applies not merely to the members of the commission, but also to the vast army of advisers and assistants who do the real work of the regulatory body. It would be foolish in the extreme to expect anything like satisfactory results from that kind of regulation; and yet, it is the only kind of regulation that can be had under the power of government.

"To suggest that the Interstate Commerce Commission be abolished would lay one open to the charge of being a 'reactionary'; yet it may be doubted whether the shippers, the government, the railroads, or consumers of commodities would be any worse off if the whole business were wiped off the statute books. They certainly couldn't be much worse off and in some particulars they might be better off.

"In any event, the net beneficial results of government regulation of the railroads, when disadvantages are also taken into consideration, are so slight as to leave the country not in a mood to sanction any extension of the policy of government regulation to other lines of business. President Harding struck a popular chord when he declared for more business in government and less government in business."—*Albany Evening Journal*.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 163 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Fred W. Venton, 836 So. Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago. (Concluded on page 466)

Operating Statistics of Large Steam Roads—Selected Items for the Month of June, 1921,

Region, road and year	Average miles of road operated	Train-miles	Locomotive-miles		Car-miles		Ton-miles (thousands)			Freight Service			
			Principal and helper	Light	Loaded (thousands)	Per cent loaded	Gross. Excluding locomotive and tender	Net. Revenue and non-revenue	Servable	Unserviceable	Per cent unservicable	of locomotives on line daily	
												Stored	
New England Region:													
Boston & Albany.....	394	243,687	262,603	29,513	4,366	63.6	235,293	91,918	122	29	19.2	...	
1920	394	325,431	345,940	33,532	5,899	68.8	328,773	153,512	133	32	19.4	...	
Boston & Maine.....	2,469	507,466	560,399	46,723	10,703	68.8	560,236	231,969	343	118	25.6	73	
1920	2,469	772,216	864,519	85,642	15,575	72.0	825,134	365,976	366	97	21.0	3	
N. Y., N. H. & H.....	1,959	450,721	489,181	32,891	10,549	66.1	554,936	234,691	303	85	21.9	39	
1920	1,938	512,100	534,855	38,140	11,114	72.8	567,606	257,338	280	81	22.4	...	
Great Lakes Region:													
Delaware & Hudson.....	880	337,717	432,930	41,002	8,222	59.4	560,818	273,600	295	20	6.3	136	
1920	858	440,955	622,165	45,318	12,026	69.8	767,341	409,559	268	33	11.0	13	
Del., Lack. & Western.....	997	493,782	600,315	111,451	14,851	67.0	839,641	390,098	302	57	15.9	47	
1920	997	548,706	670,785	126,511	16,855	70.7	963,142	483,373	286	79	21.6	2	
Erie (inc. Chic. & Erie).....	2,259	798,111	896,281	44,677	25,844	66.2	1,519,271	687,324	547	150	21.5	122	
1920	2,259	1,073,112	1,212,183	38,214	37,265	72.5	2,172,616	1,090,152	585	106	15.3	10	
Lehigh Valley.....	1,431	519,626	576,703	58,448	14,733	62.6	913,309	428,826	420	121	22.4	135	
1920	1,429	589,800	663,946	67,672	17,110	71.1	1,077,779	586,762	394	192	32.8	123	
Michigan Central.....	1,829	424,612	435,499	16,667	12,563	61.5	696,981	262,360	331	86	20.6	116	
1920	1,826	497,262	541,971	17,944	17,707	77.2	901,154	430,009	344	70	16.9	...	
New York Central.....	5,655	1,566,482	1,720,706	116,663	52,824	61.3	3,139,555	1,323,307	1,005	618	38.1	306	
1920	5,646	1,834,447	2,141,902	171,413	73,398	66.8	4,319,649	2,073,028	(1)	(1)	(1)	...	
N. Y., Chic. & St. L.....	572	308,558	309,634	364	9,506	65.3	490,385	183,133	113	52	31.5	41	
1920	573	343,187	349,012	1,675	10,960	78.3	543,106	260,450	97	58	37.4	16	
Pere Marquette.....	2,196	293,815	301,167	6,256	6,954	65.3	380,686	171,777	166	40	19.4	21	
1920	2,200	369,993	384,602	6,362	9,896	80.9	511,723	269,842	156	44	21.9	...	
Pitts. & Lake Erie.....	225	70,171	79,810	392	2,288	64.2	159,505	93,159	62	22	26.2	20	
1920	225	92,214	96,387	1,354	3,642	72.9	246,752	151,132	63	20	24.1	27	
Wabash.....	2,418	471,334	499,738	6,769	13,764	68.8	720,151	301,129	279	69	19.8	53	
1920	2,418	555,386	556,380	6,197	17,148	79.7	867,548	422,792	263	77	22.6	4	
Ohio-Indiana-Allegheny Region:													
Baltimore & Ohio.....	5,185	1,654,036	1,911,405	134,123	39,828	59.2	2,637,723	1,312,635	991	424	30.0	150	
1920	5,154	1,879,650	2,232,429	136,491	49,374	67.7	3,257,202	1,767,770	1,031	272	20.9	99	
Central of N. J.....	679	253,650	283,737	37,615	5,599	59.2	377,401	183,385	200	62	23.7	15	
1920	679	307,481	338,729	39,013	6,831	62.9	454,295	236,731	214	56	20.7	...	
Chicago & Eastern Ill.....	1,131	209,042	210,002	2,464	4,742	62.3	281,813	146,791	125	46	26.9	52	
1920	1,131	298,609	308,822	5,445	7,514	69.5	444,661	235,230	127	66	34.2	1	
C., C., C. & St. L.....	2,382	582,507	607,980	2,245	15,272	56.3	971,405	399,845	307	140	31.3	53	
1920	2,393	705,398	737,259	189	20,490	67.6	1,228,973	600,019	299	105	26.0	3	
Elgin, Joliet & Eastern.....	837	76,599	82,825	4,589	2,273	65.8	165,811	86,793	98	10	9.3	36	
1920	834	168,998	190,837	12,141	5,391	69.4	384,132	208,799	94	13	12.1	...	
Long Island.....	395	40,669	46,869	7,780	447	57.8	25,942	9,701	35	7	16.5	4	
1920	395	41,964	58,146	11,892	475	65.0	24,512	10,075	38	13	25.8	...	
Pennsylvania System.....	10,875	3,907,596	4,237,527	300,664	101,183	61.3	6,979,635	3,451,230	2,632	787	23.0	849	
1920	10,837	4,950,725	5,509,727	423,968	133,616	69.1	8,477,047	4,509,973	2,162	877	28.9	19	
Phila. & Reading.....	694	499,605	563,379	69,715	12,139	61.7	829,446	429,439	376	81	17.7	167	
1920	691	565,674	640,186	88,212	13,480	68.3	895,026	503,196	279	89	24.2	5	
Pocahontas Region:													
Chesapeake & Ohio.....	2,545	830,054	895,530	25,115	24,215	55.9	1,971,182	1,072,786	441	114	20.5	35	
1920	2,520	845,399	952,833	25,396	25,481	61.2	1,889,644	1,039,845	418	114	21.5	9	
Norfolk & Western.....	2,210	754,457	897,846	36,431	21,281	57.5	1,676,333	911,164	600	96	13.8	199	
1920	2,190	823,389	1,072,705	54,212	25,256	66.1	1,815,515	1,011,994	475	199	29.5	34	
Southern Region:													
Atlantic Coast Line.....	4,887	578,976	579,697	7,736	13,161	62.0	683,610	251,673	303	120	28.4	36	
1920	4,889	711,229	713,353	9,894	15,266	67.0	775,505	314,144	298	140	32.0	...	
Central of Georgia.....	1,908	248,631	249,711	3,337	4,919	66.1	264,794	111,635	109	24	18.0	...	
1920	1,913	265,629	268,525	5,142	5,373	74.9	268,063	123,021	106	15	12.4	...	
I. C. (inc. Y. & M. V.).....	6,151	1,541,461	1,546,630	36,607	39,205	63.1	2,453,295	1,057,489	681	102	13.0	8	
1920	6,151	2,029,416	2,039,138	39,734	52,053	66.8	3,190,739	1,480,647	724	107	12.9	23	
Louisville & Nashville.....	5,026	1,525,126	1,632,900	58,870	26,069	59.4	1,684,824	784,349	544	107	16.4	28	
1920	5,024	1,583,877	1,715,838	57,130	28,625	66.3	1,723,901	837,740	520	126	19.5	...	
Seaboard Air Line.....	3,537	375,925	380,375	4,951	7,988	68.5	404,081	162,208	167	92	35.4	...	
1920	3,537	488,520	494,128	8,674	10,934	71.7	557,972	241,381	189	85	31.1	...	
Southern Ry.....	6,942	1,165,151	1,184,634	27,007	24,463	64.4	1,316,733	532,590	885	239	21.3	68	
1920	6,942	1,534,613	1,566,869	41,983	35,301	73.9	1,812,095	824,798	909	199	18.0	4	
Northwestern Region:													
C. & N. W.....	8,299	1,326,126	1,356,769	14,063	27,327	63.6	1,532,254	636,619	852	239	21.9	129	
1920	8,318	1,695,603	1,725,783	21,830	37,515	66.3	2,148,530	911,271	691	219	24.1	...	
C., M. & St. F.....	10,618	1,313,505	1,346,474	59,600	31,798	65.6	1,713,140	747,753	830	223	21.2	176	
1920	10,626	1,619,494	1,677,353	73,409	41,652	73.0	2,165,109	1,049,421	662	273	29.2	9	
C., St. P., M. & O.....	1,726	267,606	278,218	10,167	4,918	71.3	249,796	106,167	162	51	23.9	50	
1920	1,726	332,603	360,036	15,327	6,573	78.9	333,516	158,382	172	40	18.9	30	
Great Northern.....	7,982	681,568	700,809	25,351	18,746	63.3	1,117,264	531,595	606	178	22.7	260	
1920	7,985	861,739	892,760	38,622	26,778	70.9	1,542,314	824,707	485	190	28.1	53	
M., St. P. & S. Ste. M.....	4,225	371,767	488,591	4,516	8,471	72.1	410,678	183,991	349	51	12.8	53	
1920	4,227	526,557	534,251	7,603	12,099	74.6	600,308	293,049	327	71	17.8	27	
Northern Pacific.....	6,408	627											

Compared with June, 1920, for Roads with Annual Operating Revenues above \$25,000,000

Region, road and year	Average number of freight cars on line daily				Per cent un-serviceable	Gross tons per train, excluding locomotive and tender	Net tons stored and tender	Net tons per train	Net tons per car	Net tons per car-day	Car-miles per car-day	Net ton miles per mile per day	Pounds of coal per 1,000 gross ton-miles, including road locomotive	Passenger train miles per day	Passenger service	
	Home	Foreign	Total													
New England Region:																
Boston & Albany.....	3,575	4,224	7,799	6.8	908	966	377	21.1	393	29.3	7,778	203	307,691	2,083,809		
1921	584	8,651	9,235	4.6	....	1,010	472	26.0	554	31.0	12,990	187	318,564	2,074,729	
Boston & Maine.....	18,278	12,793	31,071	20.0	3,091	1,104	457	21.7	249	16.7	3,132	147	867,147	4,733,413		
1920	7,305	29,954	37,259	8.4	....	1,069	474	23.5	327	19.3	4,941	164	868,739	4,931,967	
N. Y., N. H. & H.....	24,810	14,532	39,342	20.8	1,900	1,231	521	22.2	199	13.5	3,993	155	1,054,382	6,897,899		
1920	8,206	36,219	44,425	6.3	....	1,108	503	23.2	193	11.5	4,426	187	1,170,506	7,438,844	
Great Lakes Region:																
Delaware & Hudson.....	11,044	4,783	15,827	12.0	1,532	1,661	810	33.3	576	29.2	10,359	176	195,069	1,050,073		
1920	3,698	14,790	18,488	5.7	....	1,740	929	34.1	738	31.1	15,904	180	195,295	1,023,998	
Del. Lack. & Western.....	17,763	6,416	24,179	9.3	774	1,700	790	26.3	538	30.6	13,046	165	490,175	3,641,819		
1920	4,784	19,780	24,564	5.1	....	1,755	885	28.8	659	32.4	16,232	133	481,243	3,377,762	
Erie (inc. Chic. & Erie).....	40,520	14,775	55,295	18.9	13,070	1,904	861	26.6	414	23.5	10,143	132	668,169	5,066,239		
1920	8,521	53,637	62,158	7.1	....	2,025	1,016	29.3	585	27.6	16,088	139	690,322	4,973,659	
Lehigh Valley.....	32,225	8,786	41,011	18.3	3,957	1,758	825	29.1	349	19.1	9,992	158	358,156	2,723,155		
1920	9,732	26,553	36,285	7.2	....	1,827	995	34.3	539	22.1	13,688	164	368,292	2,836,219	
Michigan Central.....	19,812	12,404	32,216	17.1	2,092	1,642	613	20.9	272	21.2	4,781	117	573,442	5,028,171		
1920	4,083	34,915	38,998	6.8	....	1,812	865	24.3	358	19.6	7,852	112	613,225	5,753,182	
New York Central.....	90,018	46,086	136,104	14.7	31,673	2,004	845	25.1	324	21.1	7,800	112	2,312,784	19,246,684		
1920	27,576	133,365	160,941	7.5	....	2,329	1,118	28.2	429	22.8	12,238	133	2,490,356	20,156,889	
N. Y., Chic. & St. L.....	5,655	5,379	11,034	15.5	1,618	1,589	594	19.3	553	44.0	10,670	98	86,802	555,190		
1920	1,086	8,676	9,762	6.0	....	1,583	759	23.8	889	47.8	15,163	130	82,717	506,682	
Pere Marquette.....	11,436	8,608	20,044	16.4	1,000	1,296	585	24.7	286	17.7	2,608	130	314,071	1,563,114		
1920	3,823	21,100	24,923	6.2	....	1,383	729	27.3	361	16.4	4,088	152	312,263	1,601,688	
Pitts. & Lake Erie.....	17,736	7,198	24,934	25.2	1,931	2,273	1,328	40.7	125	4.8	13,824	96	107,096	572,645		
1920	3,128	20,566	23,694	13.3	....	2,676	1,639	41.5	213	7.0	22,434	81	112,495	575,681	
Wabash.....	13,166	9,642	22,808	10.2	1,159	1,528	639	21.9	440	29.2	4,152	154	516,314	2,752,472		
1920	4,632	23,112	27,744	8.3	....	1,562	761	24.7	508	25.9	5,829	158	532,259	2,787,141	
Ohio-Indiana-Allegheny Region:																
Baltimore & Ohio.....	72,087	27,739	99,826	11.3	6,892	1,595	794	33.0	438	22.5	8,439	175	1,356,941	8,622,487		
1920	23,615	87,696	111,311	6.5	....	1,733	940	35.8	529	21.8	11,434	133	1,334,708	8,110,158	
Central of N. J.....	20,498	8,421	28,919	23.8	4,801	1,489	723	32.8	211	10.9	9,009	175	359,932	1,756,282		
1920	5,003	19,516	24,519	8.9	....	1,477	770	34.7	322	14.8	11,626	133	364,218	1,604,776	
Chicago & Eastern Ill.....	17,137	2,826	19,963	9.2	4,861	1,348	702	31.0	245	12.7	4,326	164	217,614	1,412,660		
1920	7,932	12,225	20,157	9.8	....	1,489	788	31.3	389	17.9	6,933	133	227,568	1,481,450	
C., C., C. & St. L.....	18,098	15,721	33,819	11.8	5,191	1,668	686	26.2	394	26.7	5,595	131	702,864	4,372,450		
1920	4,135	32,893	37,028	7.6	....	1,742	851	29.3	540	27.3	8,357	133	764,397	4,598,670	
Elgin, Joliet & Eastern.....	9,993	3,368	13,361	7.3	3,387	2,165	1,133	38.2	217	8.6	3,458	115	(*)	(*)		
Long Island.....	2,309	3,435	5,744	2.5	1,237	638	239	21.7	56	4.5	820	382	216,940	1,255,828		
1920	585	4,734	5,319	3.0	....	584	240	21.2	63	4.6	851	133	219,429	1,252,453	
Pennsylvania System.....	221,453	67,999	289,452	11.9	62,515	1,786	883	34.1	397	19.0	10,579	128	4,949,678	32,761,740		
1920	98,222	236,381	334,603	5.4	....	1,712	911	33.8	449	19.3	13,872	133	5,367,156	35,859,091	
Phila. & Reading.....	28,377	10,444	38,821	9.7	7,874	1,660	860	35.4	369	16.9	20,624	168	518,311	2,360,312		
1920	6,056	30,751	36,807	3.9	....	1,608	904	37.3	456	17.9	24,279	133	517,875	2,378,430	
Pocahontas Region:																
Chesapeake & Ohio.....	41,652	12,000	53,652	8.8	2,114	2,375	1,292	44.3	667	26.9	14,050	116	433,739	2,463,447		
1920	11,603	24,929	36,532	11.4	....	2,235	1,230	40.8	949	38.0	13,755	133	427,333	2,430,617	
Norfolk & Western.....	36,366	5,800	42,166	8.6	2,603	2,222	1,208	42.8	720	29.3	13,743	152	394,937	2,471,169		
1920	11,344	21,888	33,232	8.6	....	2,205	1,229	40.1	1,015	38.3	15,404	133	395,992	2,570,424	
Southern Region:																
Atlantic Coast Line.....	22,298	7,076	29,374	19.6	....	1,181	435	19.1	286	24.1	1,716	123	716,762	4,368,952	
1920	6,223	23,526	29,749	13.5	....	1,090	442	20.6	352	25.5	2,142	133	734,489	4,400,048	
Central of Georgia.....	5,344	4,237	9,581	16.0	....	1,065	449	22.7	388	25.9	1,950	141	313,762	1,525,486	
1920	1,546	7,497	9,043	4.0	....	1,009	463	22.9	453	26.4	2,144	133	304,015	1,550,653	
I. C. (inc. Y. & M. V.).....	47,899	17,212	65,111	12.0	8,376	1,592	686	27.0	541	31.8	5,730	127	1,405,221	8,991,672		
1920	12,481	48,939	61,420	6.0	....	1,572	730	28.4	804	42.3	8,023	133	1,380,528	8,206,083	
Louisville & Nashville.....	39,620	15,120	54,740	25.9	108	1,105	514	30.1	478	26.7	5,202	159	935,800	5,462,924		
1920	13,553	28,066	41,619	10.3	88	1,088	529	29.3	671	34.6	5,558	133	881,378	5,219,594		
Seaboard Air Line.....	11,794	6,987	18,781	26.2	....	1,075	432	20.3	288	20.7	1,529	133	542,482	3,132,269	
1920	3,863	16,529	20,392	7.9	....	1,142	494	22.1	395	24.9	2,275	133	553,349	2,776,393	
Southern Ry.	40,339	16,641	56,980	13.8	2,962	1,130	457	21.8	312	22.2	2,557	187	1,258,794	7,467,298		
1920	14,978	50,241	65,219	5.0	....	1,181	537	23.4	422	24.4	3,960	133	1,415,416	8,752,595	
Northwestern Region:																
C. & N. W.....	49,579	22,381	71,960	8.9	6,500	1,155	480	23.3	295	19.9	2,557	172	1,664,756	10,414,546		
1920	25,077	55,323	80,400	7.7	....										

- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.**—S. W. Derr, Philadelphia & Reading, Philadelphia, Pa.
- AMERICAN ASSOCIATION OF ENGINEERS.**—C. E. Drayer, 29 S. La Salle St., 332 South Michigan Ave., Chicago.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.**—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York. Annual meeting, November 21 and 22, Carolina Hotel, Pinehurst, N. C.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—J. Rothschild, Room 400, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Burritt, 8 W. 40th St., New York. Next convention, October 3, Atlantic City. Exhibits this year will be omitted.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.**—C. Borchert, 202 North Hamlin Ave., Chicago, Ill. Next convention September 12-14, Hotel Sherman, Chicago.
- AMERICAN RAILWAY ASSOCIATION.**—J. E. Fairbanks, General Secretary, 75 Church St., New York, N. Y. Next regular meeting, November 16, 1921.
- Division I.—Operating.
Freight Station Section (including former activities of American Association of Freight Agents). R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section. J. C. Caviston, 75 Church Street, New York.
Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association), J. C. Caviston, 75 Church St., New York, N. Y.
Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents). W. A. Fairbanks, 75 Church St., New York, N. Y.
Safety Section. J. C. Caviston, 75 Church St., New York. First annual meeting, Boston, Mass., September 26.
- Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers). G. W. Covert, 431 South Dearborn St., Chicago, Ill.
- Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.
- Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill.
- Construction and Maintenance Section, E. H. Fritch.
Electrical Section. E. H. Fritch.
Signal Section (including former activities of the Railway Signal Association). H. S. Balliet, 75 Church St., New York, N. Y.
- Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association), V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. No meeting this year.
- Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association), V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
- Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association). J. P. Murphy, General Storekeeper, New York Central, Collinwood, Ohio.
- Division VII.—Freight Claims (including former activities of the Freight Claim Association), Lewis Pilcher, 431 South Dearborn St., Chicago, Ill.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichy, C. & N. W. Ry., 319 Waller Ave., Austin Station, Chicago. Next convention, October 18-20, 1921, New York City. Exhibit by Bridge and Building Supply Men's Association.
- AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.**—J. F. Jackson, Central of Georgia, Savannah, Ga. Next meeting, November, 1921, Chicago.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 14-16, Chicago. Exhibit by National Railway Appliances Association, March 13-16.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—(See American Railway Association, Division 5.)
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—R. D. Fletcher, 1145 East Marquette Road, Chicago. Exhibit by Supply Association of the American Railway Tool Foremen's Association.
- AMERICAN SHORT LINE RAILROAD ASSOCIATION.**—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.
- AMERICAN SOCIETY FOR STEEL TREATING.**—W. H. Eiseman, 4600 Prospect Ave., Cleveland, Ohio. Next convention, September 19-24, Indianapolis, Ind.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—E. M. Chandler (acting secretary), 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN TRAIN DISPATCHERS' ASSOCIATION.**—C. L. Darling, Northern Pacific Ry., Spokane, Wash.
- AMERICAN WOOD PRESERVES' ASSOCIATION.**—George M. Hunt, Chemist, Forest Products Laboratory, Madison, Wis.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—H. D. Morris, Northern Pacific R. R., St. Paul, Minn. Next annual meeting, May 19, 1922, Montreal.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.**—Jos. A. Andreucci, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Next convention, October 18-21, Hotel La Salle, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.
- ASSOCIATION OF RAILWAY EXECUTIVES.**—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
- ASSOCIATION OF RAILWAY SUPPLY MEN.**—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—(See American Railway Association, Division 1.)
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—(See American Railway Association, Division 2.)
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—A. J. Filkins, Paul Dickinson Company, Chicago. Meeting with convention of American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—W. A. Booth, 131 Charron St., Montreal, Que.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
- CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.**—Thomas B. Koneke, St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.
- CENTRAL RAILWAY CLUB.**—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.**—W. P. Elliott, Terminal Railroad Association of St. Louis, East St. Louis, Ill. Convention this year has been postponed.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.**—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.
- CINCINNATI RAILWAY CLUB.**—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio.
- EASTERN RAILROAD ASSOCIATION.**—E. N. Bessling, 614 F St., N. W., Washington, D. C.
- FREIGHT CLAIM ASSOCIATION.**—(See American Railway Association, Division 7.)
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.**—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—J. G. Crawford, 702 E. 51st St., Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 1061 W. Wabasha Ave., Winona, Minn. Next convention, which was to have been held September 12-15, Hotel Sherman, Chicago, has been postponed.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION.**—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, which was to have been held October 4-6, 1921, at Buffalo, N. Y., has been canceled.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 26 Cortlandt St., New York.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.**—(See A. R. A., Division 5.)
- MASTER CAR BUILDERS' ASSOCIATION.**—(See A. R. A., Division 5.)
- NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.**—Warren C. Nixon, Western Tie & Timber Co., 905 Syndicate Trust Bldg., St. Louis, Mo.
- NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.**—James B. Walker, 49 Lafayette St., New York. Next convention, October 11, Atlanta, Ga.
- NATIONAL FOREIGN TRADE COUNCIL.**—O. K. Davis, 1 Hanover Square, New York.
- NATIONAL RAILWAY APPLIANCES ASSOCIATION.**—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition, March 13-16, Chicago, at convention of American Railway Engineering Association.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 26 Cortlandt St., New York. Regular meeting, 3d Friday in month, except June, July and August, at 29 W. 39th St., New York.
- PACIFIC RAILWAY CLUB.**—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting, 2d Thursday in month, alternately in San Francisco and Oakland.
- RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.**—E. R. Woodson, 1116 Woodward Building, Washington, D. C.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.
- RAILWAY CLUB OF PITTSBURGH.**—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.
- RAILWAY DEVELOPMENT ASSOCIATION.**—(See Am. Ry. Development Assn.)
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.**—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
- RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.**—R. J. Himmelright, 17 East 42nd St., New York. Meeting with Traveling Engineers' Association.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md. Annual meeting, October 18-20, Hotel Sherman, Chicago.
- RAILWAY REAL ESTATE ASSOCIATION.**—R. H. Morrison, C. & O. Ry., Richmond, Va.
- RAILWAY SIGNAL ASSOCIATION.**—(See A. R. A., Division 4, Signal Section.)
- RAILWAY STOREKEEPERS' ASSOCIATION.**—(See A. R. A., Division 6.)
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, 30 Church St., New York.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next annual convention, September 20-22, 1921, Auditorium Hotel, Chicago. Exhibit by Track Supply Association.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meeting, 2d Friday in month, except June, July and August.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
- SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—C. N. Thulin, 935 Peoples' Gas Bldg., Chicago.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hilburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, 117 East 98th St., Cleveland, Ohio. Business meeting, September 6, Hotel Sherman, Chicago. Exhibit this year by Railway Equipment Manufacturers' Association has been canceled.
- WESTERN RAILWAY CLUB.**—Bruce V. Crandall, 14 E. Jackson Boulevard, Chicago. Meeting third Monday each month except June, July and August.

Traffic News

Export Grain via Montreal

The movement of grain through Montreal to Europe this season has been very heavy and it is predicted that all previous records will be exceeded. Wheat, corn and oats have all been moving in large volume. Now, however, there is a decided congestion both at Montreal and at ports on Georgian Bay, and some shippers at Chicago are fearing an embargo. It is said that 17 vessels are now afloat for Georgian Bay ports, and the elevators there are filled. These ports have facilities for unloading only three or four vessels a day. Winnipeg shippers are reported as fearing that the present congestion will interfere with free movement of Canadian wheat, which is expected to begin to move in volume to the Eastern ports early in September.

To Regulate St. Paul Live Stock Shipments

At a conference recently held at St. Paul, Minn., railway traffic officers met with the representatives of the bureaus of markets of Minnesota, South Dakota and North Dakota, to see if shipments of live stock into this territory could not be distributed more uniformly throughout the week. The railroads deliver 25 per cent of the weekly hog supply on Tuesday, about 34 per cent on Wednesday and comparatively small amounts on other days. The market being flooded, the farmers estimate that they lose about five cents a hundred pounds on all hogs arriving on Wednesday. Similar examples may be found in the other classes of live stock. It is proposed to give the zone system a trial. Under the zone method (as in effect at Chicago), stock originating within 200 miles is accepted on Tuesday and Thursday, and from other territory on Monday and Wednesday; and receipts are thus regulated to the advantage of the farmers, the packers and the railroads. A second conference will be called soon to consider rearrangements of stock train schedules.

Boston & Maine Competes With Motor Trucks

The Boston & Maine has announced radical reductions—in some cases more than 50 per cent—in its miscellaneous express rates applying to various local points within a radius of 50 miles from Boston. Some of the changes go into effect September 10; others are already in effect. These rates apply to "express matter, miscellaneous shipments of, contents unknown or not stated." They are used by industries and by the local express companies operating to communities out of Boston. The rates apply "only when an individual car is assigned exclusively to this service." The method of handling the traffic under these rates is of many years' standing.

To Amesbury, 43 miles, where the rate has been 36½ cents per lb., the new rate is 13 cents; but the minimum charge per car has been advanced from \$15 to \$20. To Concord, N. H., 73 miles, the rate is 30 cents, minimum \$45 a car. Concord does not appear in the previous tariff. Manchester, 56 miles, and Nashua, 40 miles, are two other New Hampshire towns now appearing in this tariff for the first time. To Springfield, Mass., about 100 miles, the rate, 34½ cents per 100 lb., is not changed. To Lawrence the decrease is from 18 cents to 9 cents; to Lowell, 26 miles, from 20½ cents to 9 cents. To Lynn, ten miles, 7½ cents, there is no change. To Peabody, 18 miles, the reduction is from ten cents to six cents; carload minimum advanced from \$15 to \$20.

It is understood that a further reduction will be made in the rate to Lynn to five cents per 100 lb., and that this rate will apply each day, even if a full carload is not shipped.

Ever since the congestion in railroad freight traffic which was caused by war conditions, freight between Boston and the cities within 50 miles has been carried largely by automobile trucks, until now it is said that probably 80 or 90 per cent of the business between Boston and Lynn has of late been carried in that way. To Salem, 16 miles, the percentage is believed to be about the same.

Foreign Railway News

Disastrous Collision Near Rome

Thirty persons killed and over 100 injured is the report following a collision near Magliano, Italy, ten miles north of Rome, on the night of August 27. An excursion train, in which were many children, collided with a freight.

Railways of Siam Ask Bids on Bridges

Tender forms, including general terms and specifications for the supply of superstructures of eight steel bridges for the Siamese State Railways, have been transmitted to the Department of Commerce, according to a cablegram from Consul James P. Davis, at Bangkok. The total length of these bridges will be about 1950 ft. The arrival and availability of the specifications will be announced later by the Department of Commerce.

A Short Lived Strike in Ireland

Enginemen on the Great Northern of Ireland went out on a strike at midnight of August 29, but returned to work the following afternoon on the advice of J. H. Thomas, general secretary of the National Union of Railwaymen, according to the New York Times. Mr. Thomas advised the men to go back to work after the company agreed to participate in the Irish railway arbitration now in progress. The Irish railways were returned to their owners on August 15 at the same time as the British railways were returned, but legislation similar to that provided for the roads of Great Britain has not been extended to the Irish railways.

The Service of the Department of Commerce to Foreign Trade

Commerce Reports, the daily publication of the Department of Commerce, which contains news sent to Washington by cable and by mail from representatives of the government all over the world and which is an important source of information for American concerns who are seeking opportunities to sell their goods abroad, is to be changed to a weekly publication. In this form, it is believed that the information published can be systematized and each item of news shown more nearly in its proper perspective than in the daily publication. "Commodity experts" are being appointed to handle specific information interesting to various industries such as textiles, fuel, chemicals, etc., and it is expected that Commerce Reports in its new form will be of considerably greater value to American business than it formerly has been.

China Seeking to Free Itself from Foreign Domination of Railways

The extent to which foreign-owned railways dominate the territory they serve is a source of annoyance to the Chinese government, according to a correspondent writing in the Public Ledger (Philadelphia), and an attempt to internationalize these carriers may be expected to feature the disarmament conference to be held at Washington. British, French, Japanese and Russian interests would, it is said, be affected by such a move. The principal foreign-owned railways are the Chinese Eastern, the South Manchurian, the Shantung, the Yunnan and the Hong Kong-Canton.

An example is given of the methods employed by some of these railways: "A few years ago a British group conceived the idea of building a railway in Yunnan. In order to freeze out British competition, the French set up a tariff on railway materials which made it impossible to transport them. The only way the British could have built the proposed railway was to establish steel mills of their own in the region of the line."

Proposed Subway and Tunnel for Havana, Cuba

Plans for the subway system and tunnel proposed for the city of Havana have been exhibited to a representative of the American consulate general at Havana, Cuba, according to Commerce Reports. Consul General Carlton Bailey Hurst's representative was shown documents indicating that the necessary concessions for the work had been approved by the Cuban Railroad Commission, and that the Cuba North & South Railroad Co., organized to promote this project, had been completed in accordance with Cuban laws governing the organization of companies for railroad construction. A representative of the firm of engineers in charge (Sr. Serafin Sanchez Govin, No. 62 Villegas street, Havana), holding a full power of attorney to act for the Cuba North & South Railroad Co., declared his intention of going to New York in October or November to arrange for the necessary capital and expressed a desire to receive correspondence from persons in the United States who may be interested in either the structural or the investment possibilities of the project.

The New Railway Regime in Great Britain

The railways of Great Britain were returned to their owners on August 15. Just prior to the return, the Ministry of Transport's Railway Bill (*Railway Age*, May 27, page 1209) as amended was passed by Parliament. The amendments to this bill were not of a fundamental nature, with the exception of the groupings for compulsory consolidation. In the original bill there were six groups; in the bill as passed, four. The principal carriers constituting the groups are as follows:

SOUTHERN GROUP.—London & South Western; London, Brighton & South Coast; South Eastern; London, Chatham & Dover; South Eastern & Chatham.

WESTERN GROUP.—Great Western; Alexandra Docks & Railway; Barry; Cambrian; Cardiff; Rhymney; Taff Vale.

NORTHWESTERN GROUP.—London & North Western; Midland; Lancashire & Yorkshire; North Staffordshire; Furness; Caledonian; Glasgow & South Western; Highland.

EASTERN GROUP.—North Eastern; Great Central; Great Eastern; Great Northern; Hull & Barnsley; North British; Great North of Scotland.

Exports of Track Materials in June

The June exports of steel rails totaled 20,308 tons, valued at \$1,083,344. Track spikes valued at \$79,434 and miscellaneous track materials valued at \$568,134 were the other totals. Detailed figures by countries, as compiled by the Bureau of Foreign and Domestic Commerce, follow:

Countries	Railroad spikes		Rails of steel		Switches, frogs, splice bars, etc.
	Pounds	Tons	Tons		
France					\$260
Gibraltar					166
Italy		1,219	\$79,635	16,780	
Netherlands					250
Portugal					1,441
Rumania					19
Spain					17,407
Sweden		32	3,085	565	
England		10	832	372	
Scotland					2,210
Ireland					13,301
Canada	321,680	\$11,882	1,046	56,212	32,017
Costa Rica	17,500	794	187	11,500	2,052
Guatemala	2,000	125			
Honduras			1,002	57,809	4,997
Salvador	10,000	345			1,104
Mexico	602,316	25,978	220	14,986	10,937
Trinidad and Tobago	3,000	195			180
Cuba	70,400	2,577	294	11,335	8,815
Haiti					986
Dominican Republic	29,468	1,522	650	28,856	44,130
Argentina	2,414	150			314,910
Brazil			3	210	25,171
Chile	374,782	29,303			22,082
Colombia	14,800	792	37	1,880	1,517
Peru	4,442	270	146	7,155	4,492
China					6,120
Kwangtung, leased territory			2,720	122,736	
Chosen	2,500	149			137
British India			1,001	85,600	1,423
Dutch East Indies			2,541	145,508	5,886
Japan	30,690	1,676	7,673	338,378	20,143
Siam			1,000	60,021	
Australia					4,017
New Zealand			50	4,720	1,129
Philippine Islands	80,658	3,676	177	8,111	2,715
Portuguese Africa			300	14,775	403
Total	1,566,050	\$79,434	20,308	\$1,083,344	\$568,134

Equipment and Supplies

Car Orders and Deliveries in July

The number of freight cars delivered for domestic service in July totaled 3,892 and for foreign service 433. The passenger cars delivered totaled 90, all for domestic service. On July 31, the companies had on hand undelivered orders for 6,145 freight and 218 passenger cars for domestic service and 2,088 freight and 46 passenger cars for export. Car repairs were made in July on a total of 2,281 cars for domestic service and at the end of July car repairs on order and undelivered totaled 16,765, all for domestic service, as compared with 13,752 at the end of June.

The July summary as prepared by the Railway Car Manufacturers' Association from the report of 26 car building companies follows:

NEW CARS DELIVERED		
	Domestic	Foreign
Freight	3,892	433
Passenger	90	...
ON ORDER AND UNDELIVERED		
	Domestic	Foreign
Freight	6,145	2,088
Passenger	218	46
CAR REPAIRS		
Delivered—July	2,281	
On order and undelivered, July 31		16,765

Freight Cars

THE MATHIESON ALKALI WORKS, 25 West Forty-third street, New York City is inquiring for 20, 30 ton cars for handling tanks.

THE BANGOR & AROOSTOOK has renewed its inquiry for cars and is now asking for 200 single sheathed box cars of 40 tons' capacity.

THE PITTSBURGH STEEL COMPANY, Pittsburgh, Pa., is inquiring for from 15 to 25 all steel gondola cars, of 75 tons' capacity.

THE FLEISCHMANN TRANSPORTATION COMPANY, Chicago, is inquiring for from 10 to 20 underframes for tank cars of 50 tons' capacity.

THE ERIE has entered into a contract with the Youngstown Steel Car Company, Niles, Ohio, for the repair of 400 coal cars, of 50-ton capacity.

THE BALTIMORE & OHIO, reported in the *Railway Age* of June 17, as inquiring for 500 hopper car bodies, is now inquiring for 1,000 box car bodies of 40 tons' capacity, and for 1,000 hopper car bodies of 50 tons' capacity.

THE NEW YORK CENTRAL has given an order for the repair of 250 steel cars to the Cleveland Car Company, Cleveland, Ohio, and for 500 steel cars to the Ryan Car Company, Chicago. This is in addition to the repairs reported in the *Railway Age* of July 30 and August 6 for a total of 6,500 cars.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of August 27, as asking for price on the repair of 1,250 cars, has placed orders for repairs as follows: 254 ballast cars and 500 box cars with the Pullman Company; 360 gondola cars with the Haskell-Barker Car Company; 500 box cars with the American Car & Foundry Company, and 400 box cars with the Ryan Car Company.

Iron and Steel

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS has placed orders for 900 tons of steel, of which 200 tons will be used for bridge renewals, and about 700 tons for track elevation work at Indianapolis, Ind.

THE MEIKI ELECTRIC RAILWAYS, of Japan, is asking for bids through Mitsui & Company, New York, for 25 miles of 60-lb. A. S. C. E. rail and accessories. This railway will buy rails later for an additional 29 miles.

Supply Trade News

The **Interstate Car Company**, Indianapolis, Ind., will build an addition to its foundry in that city, 91 by 126 ft., at an approximate cost of \$25,000.

H. S. Durant has been appointed sales agent, and **M. W. Floto** assistant sales agent, at the Detroit office of the **American Steel & Wire Company**, Chicago, to succeed M. Whaling and T. J. Usher, Jr., resigned.

The **Western Electric Company**, New York, has re-zoned its sales territory, and a new district, called the Atlantic district, has been established with **R. W. Van Valkenburgh** as manager with headquarters at Philadelphia, Pa. It includes the area covered by the Philadelphia and Pittsburgh houses, which formerly was part of the Western district.

Robert D. Black has been appointed manager of the Philadelphia branch office of the **Black & Decker Manufacturing Company** with headquarters at 318 North Broad street. He succeeds **W. C. Allen** who has been appointed special factory representative, with headquarters at the Cleveland branch office, 6225 Carnegie avenue. Mr. Black was formerly assistant sales manager of the company.

Horace G. Hides, who for the past 20 years represented Wm. Jessop & Sons, Sheffield, England, has been appointed general sales manager in the United States for **Thos. Firth & Sons, Ltd.**, Sheffield. This firm recently terminated its agency arrangement for the sale of sheet steel with Wheelock Lovejoy & Co., of New York and Cambridge. Mr. Hides will have his headquarters in Hartford, Conn., where a joint office has been opened by Thomas Firth & Sons, Ltd., and an associate company, the Firth-Sterling Steel Company, New York; Henry I. Moore will represent the latter company at Hartford.

Obituary

Edward A. Craig, manager of the export department of the Westinghouse Air Brake Company, Pittsburgh, Pa., died on August 28, at his home in Edgewood, Pa. Mr. Craig was

born in January, 1873, at Allegheny City, Pa., and was educated in the public schools of that city. He began work in 1888 with the Westinghouse Air Brake Company as a messenger. He subsequently served as secretary to the general superintendent of the works. He later was appointed assistant auditor and then served as auditor and assistant secretary. In 1906, the company established the Southeastern district, with Mr. Craig as manager. He remained in that position until the export department was organized in January,

1920, and since that time he served as manager of the export department.

Daniel Sellinger for over 20 years in charge of rail inspection for **Robert W. Hunt & Co.**, at the south works of the Illinois Steel Company, Chicago, died on August 24, at the age of 63.



E. A. Craig

Railway Construction

BOSTON & MAINE.—This company has awarded a contract to the McClintic Marshall Company, Pittsburgh, for the construction of a bridge over the Winnipesaukee river, Tilton, N. H. The bridge will have 5 deck plate girder spans averaging 35 ft. in length and will cost approximately \$17,000.

CANADIAN NATIONAL.—This company will receive bids until noon September 7 for the construction of the sub-structure for a single track bridge over the Coffee river, 41 miles from Doucet on the St. Maurice division.

CHICAGO, BURLINGTON & QUINCY.—This company is accepting bids for structural steel to be used in building a new freight house at Chicago.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to Roberts & Schaefer Company, Chicago, for the construction of a concrete coaling station at Morris, Ill., and to Fairbanks, Morse & Co., Chicago, for a coaling station at McFarland, Kan.

LOUISIANA & ARKANSAS.—This company is contemplating the erection of a one-story brick and reinforced concrete locomotive shop at Stamps, Ark., to cost about \$150,000.

NEW YORK CENTRAL.—This company has awarded a contract for the construction of a 30-stall roundhouse and annex buildings at Solvay, N. Y., to the W. M. Ballard Company, Syracuse, N. Y. Construction was resumed recently on this project. The same company has been awarded a contract for the construction of a 1,000-ton coaling station exclusive of machinery at Solvay. The Walsh Construction Company, Syracuse, N. Y., has been awarded a contract for the construction of a 400-ton coaling station at Waynesport, N. Y. The Link Belt Company has been awarded a contract for the machinery of both of these coaling stations and the Edward Joyce Company, Syracuse, N. Y., has been awarded the contract for the electric lighting and power wiring of the Solvay coaling station.

PACIFIC GREAT EASTERN.—On this railroad, owned and operated by the Province of British Columbia and which is now in operation to Williams Lake, about 300 miles north of Vancouver, track has been laid to Quesnel, about 50 miles beyond Williams Lake and about half the distance thence to Fort George, B. C., the proposed northern terminus, which is on the Grand Trunk Pacific. The Minister of Finance of the Province has lately sold bonds to the amount of \$1,000,000 to provide funds for continuing the work of construction north of Quesnel. The bonds, running 20 years, and bearing interest at six per cent, are said to have been sold for 93.59.

TEXAS & PACIFIC.—This company has revised its plans for the construction of a new passenger station at Ranger, Tex., and has issued another call for bids to be closed on September 15.

CENTRAL VERMONT.—This company has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a gravity sanding plant and a 300 ton coaling plant equipped with a 30,000 ton drag scraper and a mechanical storage plant at St. Albans, Vt., to cost \$40,000.

TONOPAH & GOLDFIELD.—This company has applied to the Interstate Commerce Commission for authority to construct an extension 18½ miles long from a point near Coaldale Station in Mineral county, Nevada, on its main line, to a point in Fish Lake Valley, Esmeralda county, Nevada. The extension would serve what is believed to be a "potential oil field," according to the application.

WESTERN MARYLAND.—This company opened bids on August 25 for the construction of additions to its grain elevator and facilities at Port Covington, Baltimore, Md., to cost approximately \$1,000,000. The additions will be of reinforced concrete construction and will provide storage space for 1,500,000 bushels of grain in addition to the present facilities.

Railway Financial News

BOSTON & MAINE.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan to this company of \$3,049,000 for 15 years from the revolving fund to assist it in meeting maturing indebtedness.

BULLFROG GOLDFIELD.—*Authorized to Issue New First Mortgage Bonds.*—The Interstate Commerce Commission has granted authority to this company to deliver to W. A. Clark not exceeding \$143,000 of new first mortgage 5 per cent bonds, in exchange for par, for a like aggregate amount of first mortgage 6 per cent bonds and second mortgage income bonds now outstanding; and also to deliver not exceeding \$5,000 of new first mortgage 5 per cent bonds, at par, in partial settlement of unpaid interest accrued on outstanding first mortgage bonds.

CHESAPEAKE & OHIO.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

COWLITZ, CHEHALIS & CASCADE.—*Application for Loan.*—This company has applied to the Interstate Commerce Commission for a loan of \$45,500 to meet matured obligations for equipment.

DELAWARE, LACKAWANNA & WESTERN.—*Asks Authority to Lease Road.*—An application has been filed with the Interstate Commerce Commission for authority and approval of the lease to this company of the property of the Sussex Railroad, of which it owns a majority of the capital stock.

DULUTH, SOUTH SHORE & ATLANTIC.—*Annual Report.*—The income account for the year ended December 31, 1920, compares with the preceding year as follows:

	1920	1919
Total operating revenue (Mar. 1 to Dec. 31).....	\$5,142,519	
Total operating expenses (Mar. 1 to Dec. 31).....	4,606,212	
Net operating revenue.....	536,307	
Railway tax accruals.....	250,435	
Net operating income.....	285,665	
Income from lease of road (Jan. and Feb., 1920; year 1919).....	93,725	\$530,059
Estimated amount of government guaranty due (Mar. 1 to Aug. 31).....	281,174	.....
Due from U. S. Gov't. for deficit incurred in operation of road during guaranty period (Mar. 1 to Aug. 31).....	71,013	
Gross income.....	782,023	596,706
Deduct—Interest on funded debt.....	876,770	879,760
Total deductions from gross income.....	1,111,706	1,010,214
Net loss.....	329,683	413,508

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919 as follows:

OPERATING REVENUES		
	1920	1919
Freight	\$3,576,909	\$2,815,493
Passenger	1,369,903	1,235,685
Total operating revenue.....	\$5,949,891	\$4,758,601
OPERATING EXPENSES		
Maintenance of way and structures.....	\$1,153,841	\$925,068
Maintenance of equipment.....	1,063,889	874,679
Traffic	65,572	65,518
Transportation	3,076,865	2,368,609
General	151,078	168,433
Total operating expenses.....	\$5,598,701	\$4,461,300
Net operating revenue.....	\$351,189	\$297,301
Tax accruals	356,028	269,244
Operating income	Def. \$5,275	\$27,761
PASSENGER TRAFFIC		
Number of revenue passengers carried	908,478	894,880
Number of passengers carried one mile.....	46,641,206	43,840,356
Average distance carried (miles).....	51.34	48.99
Average receipts per passenger per mile (cents).....	2.937	2.819
FREIGHT TRAFFIC		
Number of revenue tons carried	3,755,912	3,362,297
Number of tons carried one mile.....	355,596,169	296,982,503
Average distance haul of one ton (miles).....	94.68	88.33
Average receipts per ton per mile (cents).....	1.126	1.078

ERIE.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$1,733,750 from the revolving fund to assist the company in financing additions and betterments, including a considerable amount of work in reconstructing freight cars.

GEORGIA RAILROAD & BANKING COMPANY.—*Bonds Offered.*—Spencer Trask & Co., New York, and William E. Bush & Co., of Augusta, Ga., are offering at 99 and interest \$1,500,000, 30-year, 6 per cent refunding bonds. The bonds will mature October 1, 1951, and are non-callable.

The bonds are being offered subject to the approval of the stockholders, the Interstate Commerce Commission and the Railroad Commission of Georgia. This issue, which ranks equally with the \$1,000,000 4 per cent bonds of 1947, will provide for the retirement of \$300,000 6 per cent bonds and \$1,200,000 5 per cent bonds, maturing January 1, 1922. Upon completion of this financing, the total funded debt of the company will amount to \$2,500,000.

The Georgia Railrcad & Banking Company was incorporated in 1833 and owns 315 miles of railroad, including the shortest link (171 miles) connecting the Louisville & Nashville and Atlantic Coast Line railroads operated by either road. All the traffic between the two systems, except that to and from Florida, must pass over this connecting line which extends from Atlanta to Augusta, Ga. It is also interested in 247 miles of adjacent lines through security ownership and is practically the sole owner of the Georgia Railroad Bank.

The railroad property is leased jointly to the Louisville & Nashville and Atlantic Coast Line for 99 years from April 1, 1881, and together with the railroad companies in which it is interested, is operated as the "Georgia Railroad" system, which system forms an integral part of both systems.

GULF PORTS TERMINAL.—*Application to Extend Line Denied.*—The Interstate Commerce Commission has denied the application of this company for a certificate to construct an extension of its line in Baldwin County, Ala., to Mobile, approximately 25 miles. The cost of the proposed extension was estimated by the applicant at \$650,000, including \$350,000 for a trestle, 7 miles in length. The commission, in its opinion, stated that the financial success of the proposed loan would depend chiefly upon the ability of the carrier to secure a considerable volume of traffic moved between Pensacola and Mobile. The applicant's plans indicate a line of light construction, heavy grades and inadequate terminals. Any through business which it might obtain obviously would constitute a diversion of traffic from existing transportation facilities.

HOCKING VALLEY.—*Annual Report.*—A review of this company's annual report for 1920 appears on another page of this issue.

INTERNATIONAL & GREAT NORTHERN.—*Authorized to Deliver Equipment Notes and Pledge Receiver's Certificates.*—The Interstate Commerce Commission has authorized the receiver to deliver 24 notes for \$8,601 each, aggregating \$206,444 to the Baldwin Locomotive Works in part payment for eight locomotives; and to pledge receiver's certificates aggregating \$194,300 with the Secretary of the Treasury as security for a loan from the revolving fund.

MAINE CENTRAL.—*Loan Approved.*—The Interstate Commerce Commission has approved a loan of \$400,000 to aid this company in providing itself with equipment and other additions and betterments. The loan will be used in connection with the purchase of eight locomotives and miscellaneous equipment and the rebuilding of 110 rack cars.

MINERAL RANGE.—*Annual Report.*—The income account for the year ended December 31, 1920, compares with the preceding year, as follows:

	1920	1919
Total operating revenue (March 1 to Dec. 31).....	\$562,590	
Total operating expenses (March 1 to Dec. 31).....	717,801	
Net operating expenses.....	155,211	
Railway tax accruals.....	43,336	
Net operating deficit.....	198,570	
Income from lease of road (January and February, 1920; year 1919).....	24,001	\$140,579
Estimated amount of government guaranty due (March 1 to Aug. 31).....	72,003	
Due from U. S. Gov't for deficit incurred in operation of road during guaranty period (March 1 to Aug. 31).....	76,865	
Gross income	50,793	150,580
Deduct—Interest on funded debt	85,027	88,322
Total deductions from gross income	90,047	103,901
Net income or loss	Def. 39,253	46,679

The operating revenues and expenses in detail and the principal traffic statistics for 1920 compare with 1919, as follows:

OPERATING REVENUES		
	1920	1919
Freight	\$327,984	\$316,069
Passenger	3,938	4,490
Total operating revenues.....	\$669,620	\$753,226
OPERATING EXPENSES		
Maintenance of way and structures.....	\$183,741	\$165,420
Maintenance of equipment.....	254,460	256,233
Traffic	4,188	4,786
Transportation	408,914	406,358
General	15,646	13,515
Total operating expenses.....	\$866,948	\$846,313

Net operating revenue.....	Def. 197,329	Def. 93,086
Tax accruals	62,147	48,060
Operating income	Def. \$259,498	Def. \$141,147

PASSENGER TRAFFIC

Number of revenue passengers carried.....	11,298	13,414
Number of passengers carried one mile.....	129,025	147,915
Average distance carried (miles).....	11.42	11.03
Average receipts per passenger per mile (cents).....	3.052	3.035

FREIGHT TRAFFIC

Number of revenue tons carried.....	1,934,087	2,697,662
Number of tons carried one mile.....	22,858,722	31,492,496
Average distance haul of one ton (miles).....	11.82	11.67
Average receipts per ton per mile (cents).....	2.790	2.300

NORFOLK & PORTSMOUTH BELT LINE.—*Authority to Issue Notes Granted.*—This company has been granted authority by the Interstate Commerce Commission to issue a 90-day, 6 per cent promissory note for \$35,000, payable to the order of the Merchants & Farmers Bank of Portsmouth, Va., in renewal of a note for a similar amount; and to issue from time to time notes in renewal thereof for like amounts payable to that bank 90 days after date, but not later than August 25, 1922, with interest at 6 per cent.

PERE MARQUETTE.—*Asks Authority to Abandon Line.*—This company has made application to the Interstate Commerce Commission for permission to discontinue service and take up its tracks between Harrison, Mich., and Leota, a distance of approximately 10 miles. This northerly portion of the Harrison branch was originally built to take care of the lumber business, which is now practically exhausted.

Final Settlements with the Railroad Administration

The Railroad Administration announced on August 31 that it had made final settlements with the following carriers for the amounts stated:

Carolina & Northeastern.....	\$15,000
Joliet Union Depot Company.....	2,307
Lackawanna & Montrose.....	4,000
Manistique & Lake Superior.....	50,000
Meridian Terminal Company.....	702
New York, Chicago & St. Louis.....	3,000,000
Sussex Railroad.....	26,000

The Ann Arbor has paid the Railroad Administration \$600,000.

Partial Payments of Guaranty

The Interstate Commerce Commission certified to the Treasury partial payments of guaranty to the following roads:

Terminal R. R. Association of St. Louis.....	\$65,000
Trinity & Brazos Valley.....	35,000

Treasury Payments

The Treasury has announced the payment of a loan of \$65,000 from the revolving fund to the Central Vermont and partial payments of guaranty to the following roads:

American Railway Express Company.....	\$425,000
Atlantic, Birmingham & Atlantic.....	90,000
Bullfrog Goldfield.....	30,000
Chicago, Indianapolis & Louisville.....	250,000
Kansas, Oklahoma & Gulf.....	130,000
Lorama Railroad.....	5,700
Middle Tennessee.....	41,893
Mineral Point & Northern.....	6,500
Missouri Pacific.....	2,000,000
New York Dock Railway.....	50,000

The Treasury has also announced a partial payment of \$114,000 to the Atlantic Coast Line and Louisville & Nashville Railroads, joint lessees of the Georgia Railroad.

Dividends Declared

Boston & Albany.—\$2.00, quarterly, payable September 30 to holders of record August 31.

New York, Chicago & St. Louis.—2nd preferred, \$5.00, payable September 16 to holders of record September 3.

Pittsburgh, Ft. Wayne & Chicago.—Common and preferred, 1 1/4 per cent, quarterly, payable October 1 to holders of record September 10.

THE VETERANS in the service of the Chicago, Milwaukee & St. Paul will hold their annual reunion at Minneapolis on September 15 and 16, at the Curtis Hotel.

THE CHICAGO GREAT WESTERN has awarded a contract for the repair of its cars in its Kansas City and St. Paul shops to Hecker & Co., Cleveland, Ohio, who will do the repairing on a piece-work basis. This plan is somewhat similar to that of the Erie, at Marion, Ohio, except that the Great Western retains control over its plant, and only giving out the work to contractors.

RAILWAY AGE

Railway Officers

Financial, Legal and Accounting

A. H. Orci has been appointed general counsel of the National Railways of Mexico with headquarters at Mexico City.

I. J. Terroba has been appointed general auditor of the National Railways of Mexico with headquarters at Mexico City. **J. R. Gamez** has been appointed auditor of passenger receipts with the same headquarters.

Operating

J. M. Carpio has been appointed assistant to the general manager of the National Railways of Mexico with headquarters at Mexico City.

M. T. Vela has been appointed superintendent of car service of the National Railways of Mexico with headquarters at Mexico City. **C. M. Durazo** has been appointed superintendent of the sleeping car department and **J. M. Del Campo** has been appointed superintendent of telegraph, both with headquarters at Mexico City.

M. Acosta, superintendent of the Pacific division of the National Railways of Mexico, has been transferred to a similar position on the Guadalajara division with headquarters at Guadalajara, succeeding P. S. Alvarez. **J. Mejia**, superintendent of the Oaxaca division, succeeds Mr. Acosta and **P. W. Caballero** succeeds Mr. Mejia.

C. W. Coe, general superintendent of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, has been appointed assistant general manager in charge of operation and maintenance with headquarters at Cleveland, succeeding **F. P. Barr**, who has been appointed general traffic manager. The office of general superintendent has been discontinued, effective August 15.

Traffic

A. G. Roel has been appointed traffic manager of the National Railways of Mexico with headquarters at Mexico City.

S. M. Jackson has been appointed commercial agent of the Cincinnati, Indianapolis & Western, with headquarters at St. Louis, Mo.

E. L. Blandford has been appointed commercial agent of the Louisville & Nashville with headquarters at New York, effective September 1.

C. A. Swope has been appointed general Eastern freight agent of the Louisville & Nashville with headquarters at New York, effective September 1.

F. P. Barr, assistant general manager in charge of operation and maintenance of the Wheeling & Lake Erie, with headquarters at Cleveland, Ohio, has been promoted to general traffic manager with the same headquarters, effective August 15.

Obituary

John Sayer, formerly secretary and treasurer of the Lehigh & Hudson River, died on August 24, at Warwick, N. Y., at the age of 76 years. Mr. Sayer retired in 1917 after 52 years' active service with the company.

Frederick U. Adams, a mechanical engineer and scientific writer, who at one time conducted experiments for the Baltimore & Ohio on the effect of atmospheric resistance on the speed of trains, died at his home at Larchmont, N. Y., on August 28.

F. F. Gaines, formerly superintendent of motive power of the Central of Georgia, died at Washington, D. C., on August 26. Mr. Gaines was born on March 28, 1871, at Hawley, Pa. He entered railway service in 1888 as a freight and ticket clerk for the Erie. Two years later he resigned to enter Cornell University, at which institution he studied for the following four years. Upon leaving the university he served in the shops of the Erie for a time and in August, 1895, became a draughtsman for the Lehigh Valley and the following year was appointed engineer of tests. In April, 1897, he was promoted to mechanical engineer and in November, 1902, he was appointed master mechanic. Two years later Mr. Gaines became mechanical engineer of the Philadelphia & Reading and in 1906 he went to the Central of Georgia as superintendent of motive power. In 1917 Mr. Gaines resigned as superintendent of motive power on account of ill-health but continued in the service of the company. In July, 1918, he was appointed a member of the committee of standards of the Railroad Administration and the following year was elected chairman of the Board of Wages and Working Conditions. He subsequently served as a member of Railway Board of Adjustment No. 3. Mr. Gaines was president of the American Railway Master Mechanics' Association in 1914 and 1915.



F. F. Gaines

Louis Pierre Alexandre Weissenbruch, General Secretary of the Permanent Commission of the International Railway Association, whose death at Brussels, Belgium, on August 7, was noticed briefly in the *Railway Age* of August 27, had been connected with the International Railway Congress since its first session, in 1885, having begun as a private secretary. He was well known to many railroad men in America, having visited this country in 1904 and 1905 in connection with the seventh session of the Congress, which was held at Washington in the latter year. He was a general inspector of the Belgian State Railways, interested more particularly in signaling; and his writings have appeared occasionally in the *Railway Age*. The last was in the issue of July 2, 1920, an abstract of an exhaustive article on cab signals in Europe. Since the great war, Mr. Weissenbruch had been engaged in the organization of the International Railway Association (the old organization, the "Congress" having been declared defunct by the Belgian Government) and the preparations for the Ninth Congress, to be held at Rome, Italy, next April, had been well advanced.

Mr. Weissenbruch was 64 years old, and was born at Liege, Belgium. He was graduated from Brussels University and from the military school of Brussels and was brevetted sub-lieutenant of engineering in 1879. He served three years with the artificers of engineering at Antwerp, and in July, 1882,



L. P. A. Weissenbruch

was appointed to a position with the ministry of railroads at Brussels. In a short time he was appointed railroad engineer and private secretary to the Minister, and thence was successively promoted to be engineer; chief engineer in the traction department; specialist in the department of commercial administration; chief of section in the railroad department, and (1901) director of the safety appliances department. Mr. Weissenbruch had been "reporter" for the Congress on various technical subjects, having presented papers to the Congresses of 1885, 1887, 1889, 1892 and later. He is also the author of numerous technical articles in the Bulletin of the Congress and in other publications. As editor of the Bulletin (one of his duties as secretary) he has with marked discretion enriched its pages with many valuable reprints from technical periodicals of all countries. He was one of the editors of the French edition of the History of Russian Railroads down to 1892, which was published by the Russian Government.

One of his friends in England, Mr. T. S. Lascelles, has sent us an appreciation, from which we quote:

"Monsieur Weissenbruch passed out of the Military College with first class rank in the special arms section. In the maintenance of way department of the State Railways, he specialized on signalling questions and was appointed assistant signal engineer in 1898. This position he occupied until 1901 when he became chief signal engineer. In this capacity he executed a complete reformation of the signal system on the State Railways on principles elaborated by himself, after an exhaustive study of the methods in use in every other country. The result was a very sound and efficient system extremely well suited to the conditions of working obtaining in Belgium. A great admirer of English practice he incorporated the best of it with the best German practice, notably the Siemens alternating current lock-and-block apparatus. He adopted the upper quadrant semaphore and the yellow light for the caution indication and extensively employed power distant signals. Under his direction some ten or eleven all-electric interlockings were put in, including large ones at Antwerp, Brussels, Ghent and Louvain. These were Siemens pattern and were specially designed to answer to Belgian requirements, set forth in a specification due to him. Fogs being rather prevalent in many parts of Belgium he gave special attention to the fog-signalling problem and directed numerous experiments with cab-signals. He investigated carefully almost every one that had reached a practical stage. Although no cab signal was adopted by the State Railways he overcame the fog difficulty by installing repeating light-signals on the crowded Brussels-Antwerp main line; and it is interesting to note that the same thing has since been adopted on the London electric lines, in a modified form, with great advantage. Automatic stops also formed the subject of many experiments which he was actively prosecuting when the war broke out. He was one of the founders of the International Railway Association. He understood American methods, many of which he admired.

"When the great war came he and his family had to leave Belgium and he resided at Bexhill, England, on the seacoast about 30 miles east of Brighton, until the liberation of his native country. While there, his time was occupied with studying English signalling and other features of railway operation, upon which he made a report to the Belgian Government. Returning to Belgium after the war he addressed himself energetically to the rehabilitation of the railways and was appointed general inspector. He introduced a special system of absolute block working by telephone to safeguard train operation until the lock-and-block system could be reinstated, much of the apparatus having been destroyed by the Germans. In the midst of these activities death overtook him at the comparatively early age of 64.

"Mr. Weissenbruch was president of the National Railway Schools of Belgium, a member of the Order of Leopold, of the Order of the Crown, Chevalier of the Legion of Honour, a member of some eight or nine foreign orders, honorary member of the Signal Section, American Railway Association, and of the Institution of Railway Signal Engineers in England. He was a man of wide knowledge, a profound student and a capable linguist. His death removes one of the ablest figures in the field of railway signaling."